ORDER NO. SD81061948C4

Service Manual

QUARTZ Turntable System

SL-Q303

[PA], [PE], [PC]

SL-Q303(K)

[PC]

Areas

* [PA] is available in far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio Club.

*** The colors of this model included silver and black.**
*** The black type model is provided with (K) in the Service Manual.**

Please use this manual together with the service manual for model No. SL-Q303/SL-Q303 (K), Order No. SD81061944C8.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	~110–120/220–240V, 50 or 60 Hz
Power consumption:	7 W
Dimensions:	43×10.6×37.5 cm
(W×H×D)	(16-15/16"×4-3/16"×14-3/4")
	43×37×42 cm
	(16-15/16"×14-9/16"×16-17/32")
	Maximum height when top (dust cover) is open.
Weight:	6.5 kg (14.3 lb.)

■ Turntable section

Type:	Quartz direct drive Automatic turntable Automatic start Auto return Auto stop Repeat play Manual play
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter	Aluminum die-cast Diameter 31.2 cm (12-9/32" inches)
Turntable speeds:	33-1/3 rpm and 45 rpm
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)

*This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter. Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	–56 dB (IEC 98A Unweighted) –78 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Universal tonearm "S" shaped tubular arm Static balanced type
Effective length:	230 mm (9-1/16")
Overhang:	15 mm (19/32")
Tracking error angle:	Within 2°32' at the outer groove of 30 cm (12") record Within 0°32' at the inner groove of 30 cm (12") record
Friction:	Less than 7 mg (lateral, vertical)
Effective mass:	11 g (without cartridge)
Stylus pressure adjustment range:	0–2.5 g
Applicable cartridge weight range:	3.5—7.5g
Headshell weight:	7.5 g
Phono cable capacitance:	135pF

■ Cartridge section

Type:	Moving magnet stereo cartridge
Frequency response:	20 Hz to 25 kHz
Output voltage:	2.5 mV 1 kHz, 5 cm/s. zero to peak lateral velocity (7 mV 1 kHz, 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation:	22 dB 1 kHz
Channel balance:	Within 2 dB at 1kHz
Load impedance:	47 kΩ to 100 kΩ
Stylus pressure:	1.75±0.25 g (17.5±2.5 mN)
Replacement stylus:	EPS-74STSD (ATN71)

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shinbashi, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CHANGES

■ REPLACEMENT PARTS LIST

[K]-marked parts are used for black type only.

Ref. No.		Change of Part No. SL-Q303/Q303 (K) (ORDER NO. SD81061944C8)	→ SL-Q303/Q303 (K) [PA, PE, PC]	Part Name & Description	Per Set (Pcs.)	Remarks
CAPACITORS						
C401	△	ECQE2A473MZ ECQU2A473MF	ECQE2A473MZ	Polyester, 250VAC 0.047μF, ± 20%	1	
CABINET and CHSSIS PARTS						
35	△	SJA141 SJA139 SJA137	**SJA83**	AC Cord	1	
36		SFUMQ34N09 SFUMQ34N01	SFUMQ34N09	Bushing, AC Cord	1	
39		SFNNQ34S01 SFNNQ34G02	SFNNQ34P01 [PA, PE]	Name Plate	1	○
		SFNNQ34X01 SFNNQ34R01	SFNNQ34P01 [PC]	Name Plate	1	○
TONEARM PARTS						
86		EPC–U25S	EPC74SMAD	Cartridge	1	
		EPS–25CS	EPS74STSD	Stylus	1	
SCREW and NUT						
N25		SFCZV8800	SFPEV7803	Screw, Cartridge	2	
N26		Addition	SFPEN3302	Nut, Cartridge	2	
ACCESSORIES						
A1		SFNUQ34S01 SFNUQ34G01 SFNUQ34X01	SFNUQ34P01	Instructions Book, Printed Matter	1	○
A4		SFDK119118	Deletion	2 Pin Plug	0	
A5		Addition	QJP0603S	Adaptor, Gimens	1	
PACKING PARTS						
P1	○	SFHPQ34M01	SFHPQ34M01	Carton Box (Silver)	1	
	○	SFHPQ34C01				
	[K]	SFHPQ34M21	[K] SFHPQ34M21 [PC] only	Carton Box (Black)	1	

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ORDER NO. SD81061944C8

Service Manual

QUARTZ Turntable System

SL-Q303

[E], [EK], [XL], [EG], [EB],
[EF], [XA], [XM], [EH], [Ei], [EC]

SL-Q303(K)

[E], [XL], [XA], [EH]

*** The colors of this model include silver and black.**
*** The black type model is provided with (K) in the Service Manual.**

English

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EF] is available in France.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [EH] is available in Holland.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	~110–120/220–240V, 50 or 60 Hz
Power consumption:	7 W
Dimensions:	43×10.6×37.5 cm
(W×H×D)	(16-15/16"×4-3/16"×14-3/4")
	43×37×42 cm
	(16-15/16"×14-9/16"×16-17/32")
	Maximum height when top (dust cover) is open.
Weight:	6.5 kg (14.3 lb.)

■ Turntable section

Type:	Quartz direct drive Automatic turntable Automatic start Auto return Auto stop Repeat play Manual play
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter	Aluminum die-cast Diameter 31.2 cm (12-9/32" inches)
Turntable speeds:	33-1/3 rpm and 45 rpm
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)

*This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter. Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	−56 dB (IEC 98A Unweighted) −78 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Universal tonearm "S" shaped tubular arm Static balanced type
Effective length:	230 mm (9-1/16")
Overhang:	15 mm (19/32")
Tracking error angle:	Within 2°32′ at the outer groove of 30 cm (12") record Within 0°32′ at the inner groove of 30 cm (12") record
Friction:	Less than 7 mg (lateral, vertical)
Effective mass:	11 g (without cartridge)
Stylus pressure adjustment range:	0–2.5 g
Applicable cartridge weight range:	(See page 14)
Headshell weight:	7.5 g
Phono cable capacitance:	135pF

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ Cartridge section

Type:	Moving magnet
Frequency response:	10 Hz~35 kHz 20 Hz~10 kHz ±1 dB
Output voltage:	2.5 mV at 1 kHz 5 cm/s. zero to peak lateral velocity (7mV at 1 kHz 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation:	22 dB at 1 kHz
Channel balance:	Within 1.8 dB at 1 kHz
Compliance (dynamic):	10×10^{-6} cm/dyne at 100 Hz
Stylus pressure:	1.75±0.25 g (17.5±2.5 mN)
Load impedance:	47 kΩ to 100 kΩ
Weight:	5 g (cartridge only)
Replacement stylus:	EPS-25CS (Equivalent replacement stylus) EPS-25ES (Elliptical stylus).

Deutsh

TECHNISCHE DATEN

Änderungen de technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind circa Werte.

■ Allgemeine Daten

Stromversorgung:	~110–120/220–240 V, 50/60 Hz Wechselstrom
Leistungsaufnahme:	7 W
Abmessungen (B×H×T):	43×10,6×37,5 cm (43×37×42 cm Maximale Höhe bei geöffnetem Oberteil (Staubabdeckung).)
Gewicht:	6,5 kg

■ Plattenspieler

Typ:	Quarz-Direktantrieb Automatischer Plattenspieler Startautomatik Rückführautomatik Stopautomatik Wiederhol-Betrieb Manueller Betrieb
Antrieb:	Direktantrieb
Motor:	Kollektorloser Gleichstrommotor
Antriebsregel-Methode:	Quarz-Steuerung QPL
Plattenteller:	Aluminium-Spritzguß Durchmesser 31,2 cm
Plattenteller-Drehzahlen:	33-1/3 und 45 U/min
Gleichlaufschwankungen:	0,012% WRMS* 0,025% WRMS (JIS C5521) ±0,035% Spitze (IEC 98A bewertet)

*Diese Nennleistung bezieht sich auf das Laufwerk-Bauteil allein, ausschließlich Einflüsse von Schallplatte, Tonabnehmer oder Tonarm, aber einschließlich Plattenteller. Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

Rumpel-Fremdspannungsabstand:	−56 dB (IEC 98A unbewertet)
Rumpel-Geräuschspannungsabstand:	−78 dB (IEC 98A bewertet)

■ Tonarm

Typ:	Universal-Tonarm S-förmiger Rohrtonarm Statisch ausbalanciert
Effektive Länge:	230 mm
Überhang:	15 mm
Spurfehlwinkel:	2°32′ bei der Einlaufrille einer 30 cm-Platte 0°32′ bei der Auslaufrille einer 30 cm-Platte
Lagerreibung:	Weniger als 7 mg (horizontal, vertikal)
Effektive Masse:	11 g (ohne Tonabnehmer)
Auflagekraft-Einstellbereich:	0—2,5 g
Zulässiger Tonabnehmer-Gewichtbereich:	(Siehe. Seite 14)
Tonarmkopf-Gewicht:	7,5 g
Phonokabl-Kapazitanz:	135 pF

■ Tonabnehmer

Typ:	Magnetischer Tonabnehmer
Frequenzgang:	10 Hz bis 35 kHz 20 Hz bis 10 kHz±1 dB
Ausgangsspannung:	2,5 mV bei 1 kHz 5 cm/s. Null-zu-Spitze, lateral [7mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 500)]
Kanaltrennung:	22 dB bei 1 kHz
Kanalabweichung:	Innerhalb 1,8 dB bei 1 kHz
Nachgiebigkeit (dynamisch):	10×10^{-6} cm/dyn bei 100 Hz
Auflagekraft:	1,75±0,25 g (17,5±2,5 mN)
Impedanz:	47 kΩ bis 100 kΩ
Gewicht:	5 g (nur Tonabnehmer)
Ersatznadel:	EPS-25CS (Gleichwertige Ersatznadel EPS-25ES.)

Français

CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation: Alternatif 110-120/220-240V, 50 ou 60 Hz
Consommation: 7 W
Dimensions: 43×10,6×37,5 cm
(L×H×P) [Hauteur maximum lorsque le dessus (couvercle protège-poussière) est ouvert. 43×37×42 cm]
Poids: 6,5 kg

■ Platine de lecture

Type: Entraînement direct à quartz
Platine automatique
Démarrage automatique
Retour automatique
Arrêt automatique
Audition répétée
Audition à commande manuelle
Système d'entraînement: Entraînement direct
Moteur: Moteur C.C. sans balai
Groupe de réglage: Réglage d'accrochage de phase par quartz
Plateau de lecture: En aluminium moulé sous pression
Diamètre 31,2 cm
Vitesses de rotation: 33-1/3 et 45 t/p.m
Pleurage et scintillement: 0,012% de valeur efficace*
0.025% de valeur efficace (JIS C5521)
±0,035% de crête (IEC 98A Pondéré)

*Ce régime nominal se rapporte à l'ensemble du tourne-disque seul, excluant les effets du disque, de la cellule pick-up ou du bras de lecture, mais comprenant le plateau, Mesuré par l'obtention d'un signal provenant du générateur de fréquences incorporé de l'ensemble du moteur.

Ronflement: −56 dB (IEC 98A Non pondéré)
−78 dB (IEC 98A Pondéré)

■ Bras de lecture

Type: Bras de lecture universel
Bras tubulaire en forme de "S"
De type à équilibrage statique
Longueur effective: 230 mm
Porte-à-faux: 15 mm
Angle d'erreur de piste: En deçà de 2° 32' au sillon extérieur d'un disque de 30 cm
En deçà de 0° 32' au sillon intérieur d'un disque de 30 cm
Frottement: Moins de 7 mg (latéral et vertical)
Masse réelle: 11 g (sans la cellule pick-up)
Plage de réglage de la pression d'appui: 0–2.5 g
Gamme du poids des cellules pick-up utilisables: (Voir page 14.)
Poids de la coque porte-cellule: 7,5 g
Capacitance propre du câble pick-up: 135 pF

■ Cellule pick-up

Type: Aimant mobile
Réponse en fréquence: 10 Hz à 35 kHz
20 Hz à 10 kHz±1 dB
Tension de sortie: 2,5 mV à 1 kHz; 5 cm/s., zéro à vitesse latérale de crête
(7 mV à 1 kHz
10 cm/s., zéro à vitesse 45° de crête [DIN 45 500])
Séparation de canal: 22 dB à 1kHz
Equilibrage des canaux: En deçà de 1,8 dB à 1 kHz
Elasticité (dynamique): 10×10^{-6} cm/dyne à 100 Hz
Pression de la pointe de lecture: 1,75±0,25 g
(17,5±2,5 mN)
Impédance de charge: 47 kΩ to 100 kΩ
Poids: 5g (cellule seule)
Pointe de lecture de remplacement: EPS-25CS
(Pointe de lecture de remplacement équivalente: EPS-25ES)

Español

ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
El peso y las dimensiones indicados son aproximados.

■ En general

Alimentación de corriente: ~110–120/220–240 V, 50 ó 60 Hz
Consumo de corriente: 7 W
Dimensiones: 43×10,6×37,5 cm
(Ancho×Alto×Prof.) (43×37×42 cm
Altura máxima cuando la parte de arriba (tapa contra el polvo) está abierta.)
Peso: 6,5 kg

■ Sección del plato giratorio

Tipo: Accionamiento directo por cuarzo
Plato giratorio automático
Arranque automático
Retorno automático
Parada automática
Ejecución repetida
Ejecución manual
Método de accionamiento: Accionamiento directo
Motor: Motor de corriente continua sin escobillas

Método de control de accionamiento: Control enclavado de fase de cuarzo
Platillo del plato giratorio: Aluminio fundido
Diámetro 31,2 cm
Velocidades del plato giratorio: 33-1/3 y 45 rpm
Ululaciones y trémolo: 0,012% WRMS*
0,025% WRMS (JIS C5521)
±0,035% cresta
(IEC 98A Ponderado)

*Estas características se refieren únicamente al conjunto del plato giratorio, con exclusión de los efectos provenientes del disco, cartucho o del brazo sonoro, incluyendo, empero, el platillo. La medida fue tomada por medio de la señal obtenida del generador de frecuencia incorporado del conjunto del motor.

Ruido de rodadura: −56 dB (IEC 98A No ponderado)
−78 dB (IEC 98A Ponderado)

■ Sección del brazo sonoro

Tipo: Brazo sonoro universal
Brazo tubular en forma de "S"
Tipo equilibrado estático
Longitud efectiva: 230 mm
Proyección: 15 mm
Angulo de error de seguimiento: Inferior a 2°32′ en el surco exterior de un disco de 30 cm
Inferior a 0°32′ en el surco interior de un disco de 30 cm
Fricción: Menos de 7 mg
(en sentido lateral y vertical)
Masa efectiva: 11 g (sin cartucho)
Radio de ajuste de la presión de la aguja: 0 a 2,5 g
Radio de peso de cartucho utilizable: (Véase en la página 14)
Peso de la cápsula de la cabeza: 7,5 g
Capacitancia de cable de fono: 135 pF

■ Sección del cartucho

Tipo: Imán móvil
Respuesta de frecuencia: de 10 Hz a 35 kHz
de 20 Hz a 10 kHz ±1 dB
Voltaje de salida: 2,5 mV a 1 kHz
Con velocidad lateral de cero a cresta de 5 cm/s
[7 mV a 1 kHz Velocidad de 45° de cero a cresta de 10 cm/s (DIN 45 500)]
Separación de canales: 22 dB a 1 kHz
Equilibrio de canales: Sin exceder 1,8 dB a 1 kHz
Elasticidad (dinámica): 10×10^{-6} cm/dina a 100 Hz
Presión de la aguja: 1,75 ±0,25 g (17,5 ±2,5 mN)
Impedancia de carga: 47 kΩ a 100 kΩ
Peso: 5 g (cartucho sólo)
Aguja de recambio: EPS-25CS
(Aguja de recambio equivalente: EPS-25ES.)

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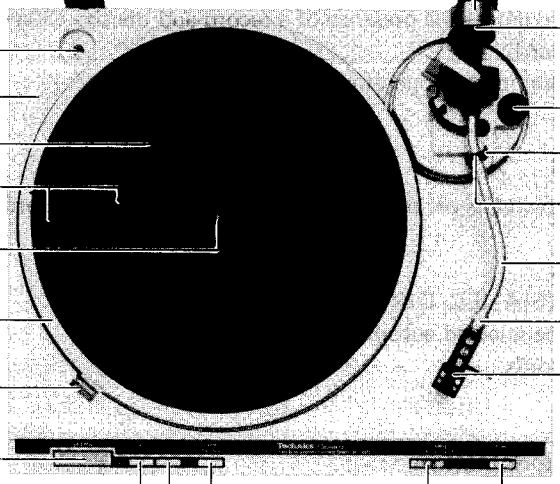
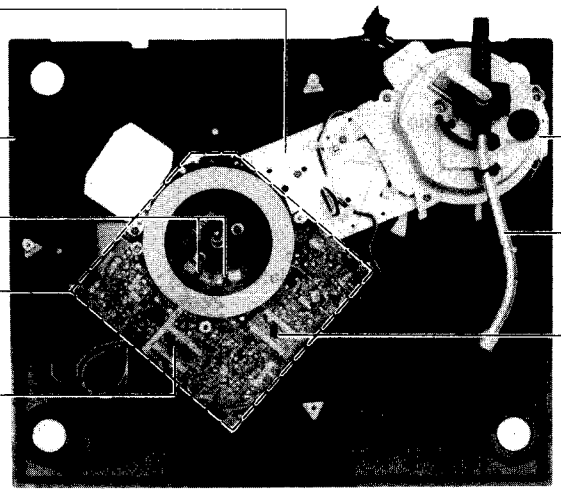
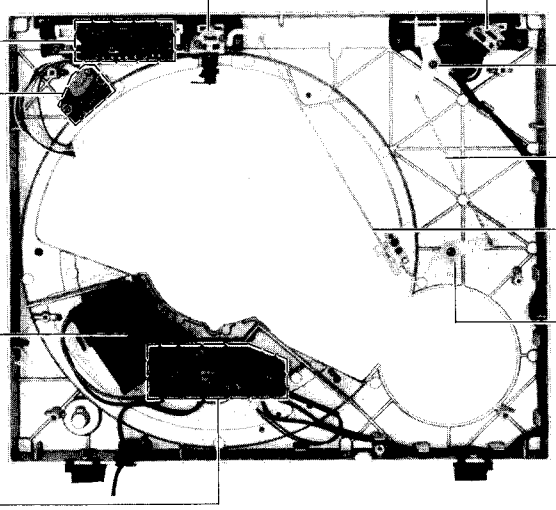
■ LOCATION OF CONTROLS







■ TECHNICAL EXPLANATION

• Principles of Auto Size Detection

This unit employs a mechanical detection system instead of a conventional electrical detection system.
The mechanical system makes it possible to detect the presence of a record and the size (30cm/17cm) of the record.
However, it is unable to detect a 25cm record.
It is detected as a 17cm record. In that case, manual operation is required.

Note:
Playing special records
Follow "Manual play" for playing the following types of records. (Special records may interfere with correct automatic operation.)
This is not a malfunction of the turntable.
* Non-standard size records (standars size (EIA, IEC, DIN, JIS.) are 17,25 and 30 cm).
(However, 25 cm (10") records can not be selected automatically by sensor.)
* Sono-sheets, on light record and thin records.
* Badly warped records.

• Mechanism operation for auto size detection

The mechanism and the part names necessary for auto size detection are shown in **Fig. A.**

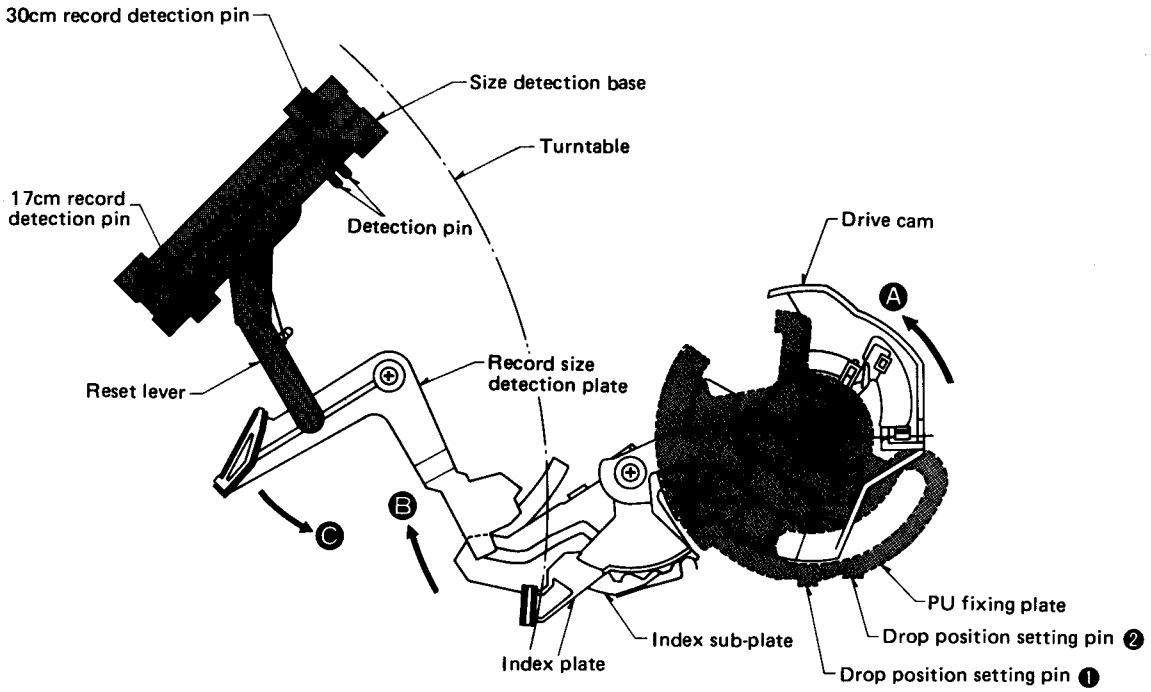


Fig. A

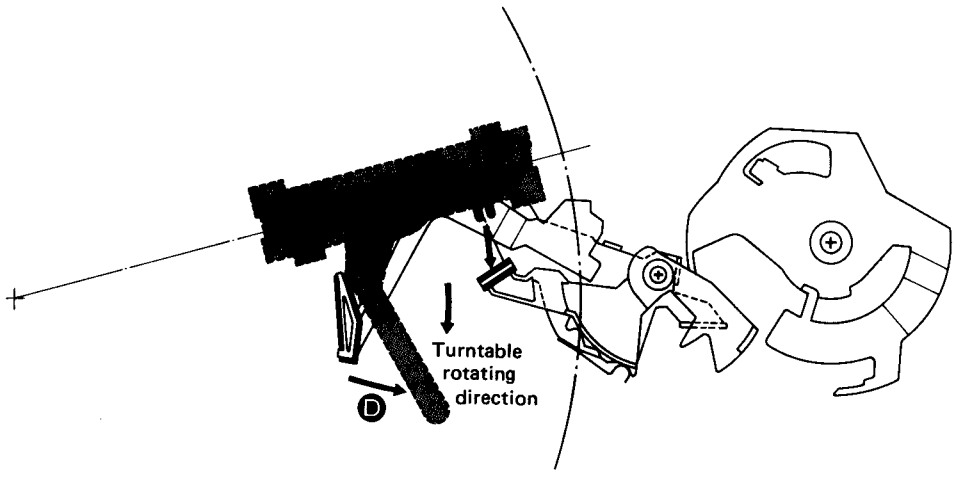


Fig. B

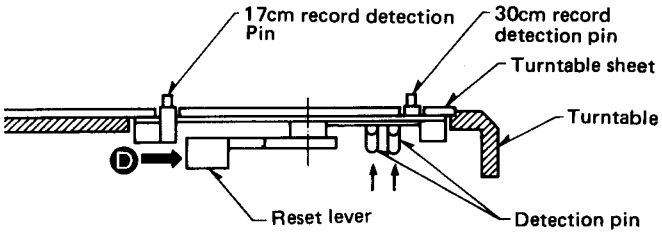
Detection of a record

1. When the start button is pressed without putting a record on the turntable, the drive cam rotates in the direction of arrow Ⓐ to turn the index sub-plate in the direction of arrow Ⓑ. At that time, the index plate moves in the same manner as the index sub-plate. **(See Fig. A)**
2. The record size detection plate interlocked with the index sub-plate rotates in the direction of arrow Ⓒ. **(See Fig. A)**
3. Then, the reset lever of the size detection base, attached to the turntable, is pushed by the record size detection plate and moves in the direction of arrow Ⓓ. **(See Fig. B)**
4. When the reset lever is pushed, the record detection pins are projected on both inside and outside. In this case, as both detection pins are up, they do not touch the index plate even when the turntable rotates. **(See Fig. B, C-a)**
5. The index plate does not move when no record is on the turntable (dotted line in **Fig. D**). Then, the turntable rotates 3 times for detecting 3 times. (The same holds true for record size detection.)
6. When the index plate position has been determined, the PU fixing plate tends to move the arm, but the arm does not move because the short drop position setting pin ❶ of the PU fixing plate touches the no-record detecting part of the index plate. **(See Fig. D)**

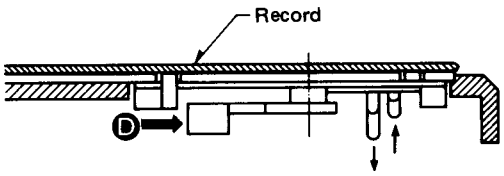
Detection of 30cm record

1. The operation is the same as for record detection, but as a record is on the turntable, both inside and outside detection pins are down. **(See Fig. C-b)**
2. As the detection pins are down, only the inside detection pin is down. **(See Fig. C-b)**
3. The detection pin touches the index plate and pushes it in the direction of arrow Ⓔ. Then, the index plate position is as shown by the solid line in **Fig. D**.
4. When the index plate position has been determined, the PU fixing plate moves the arm inward, but the 30cm record detecting part of the index plate touches the drop position setting pin ❷ of the PU fixing plate, causing the arm to drop at the position. **(See Fig. D)**

a. No record



b. 30cm record detection



c. 17cm record detection

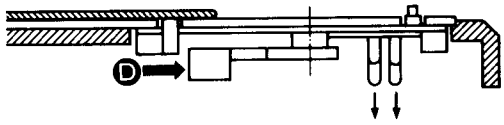


Fig. C

Detection of 17cm record

1. In the case of 17cm record, the outside detection pin is up and the inside pin is down. Therefore, both detection pins are down. **(See Fig. C-c)**
2. The detection pin touches the index plate to push it in the direction of arrow Ⓕ. In this case, the index plate position is as shown by the broken line in **Fig. D.** (As both detection pins are down, the index plate is pushed much more than in 30cm.)
3. When the index plate has been determined, the PU fixing plate moves the arm inward, but the 17cm record detecting part of index plate touches the drop position setting pin ❷ of the PU fixing plate, causing the arm to drop at the position. **(See Fig. D)**

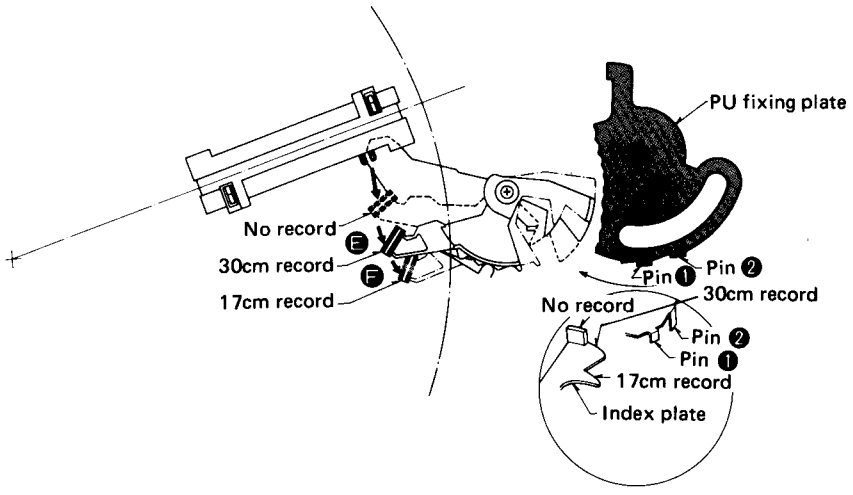


Fig. D

■ DISASSEMBLY INSTRUCTIONS

• How to remove the main base and cabinet

1. Fix the tonearm on the rest.
2. Remove the headshell and counter weight.
3. Remove the turntable.
4. Remove the panel cover setscrews ❶ ~ ❸ and earth lead setscrew ❹. **(See Fig. 1)**
5. Remove the connectors ❺ and ❻ of the drive circuit P.C.B. **(See Fig. 1)**
6. Close the dust cover, and turn over the unit, taking care not to scratch it.
7. Remove the insulator setscrews ❼ ~ ❿ and phono cord clamper setscrew ⓫. **(See Fig. 2)**
8. Turn the unit up, holding the main base and cabinet.
9. Remove the dust cover.
10. Remove the tonearm from the rest, shift the tonearm inward, and lift the cabinet. Then, the main base and cabinet can be disassembled. **(See Fig. 3)**
11. When assembling the main base and cabinet, make sure that the cueing lever of the arm base is engaged with the cueing ring of the cabinet. **(See Fig. 4)**

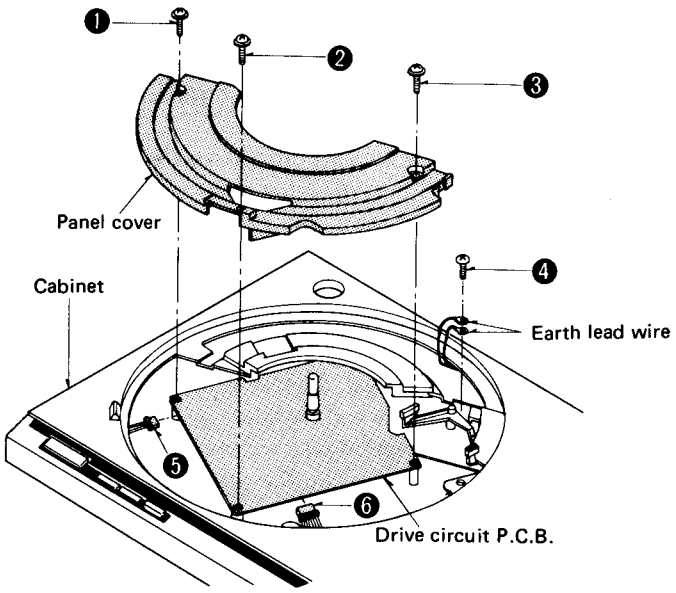


Fig. 1

※ The insulator spring (black) at this position is different from other three springs.

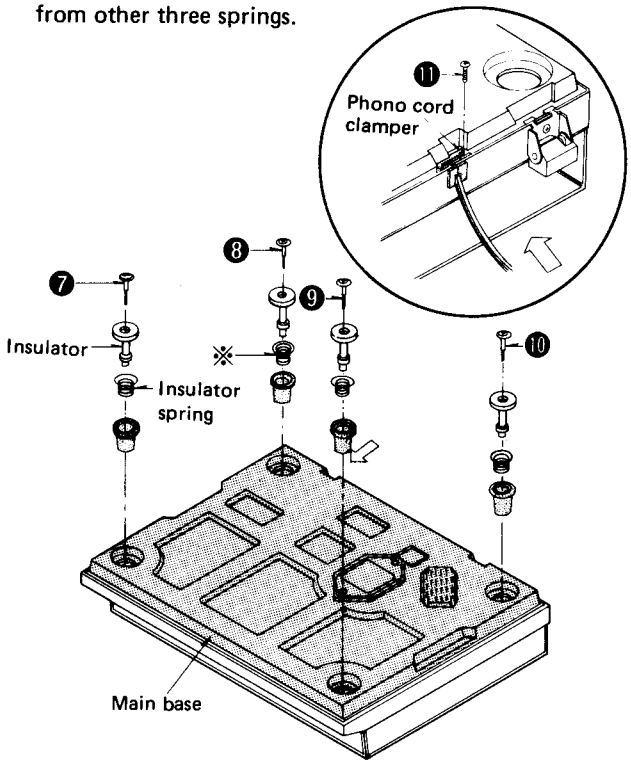
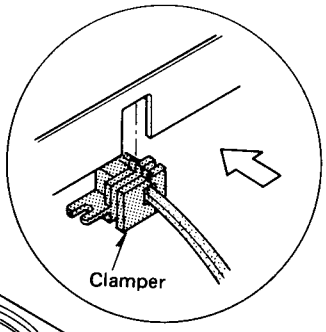


Fig. 2



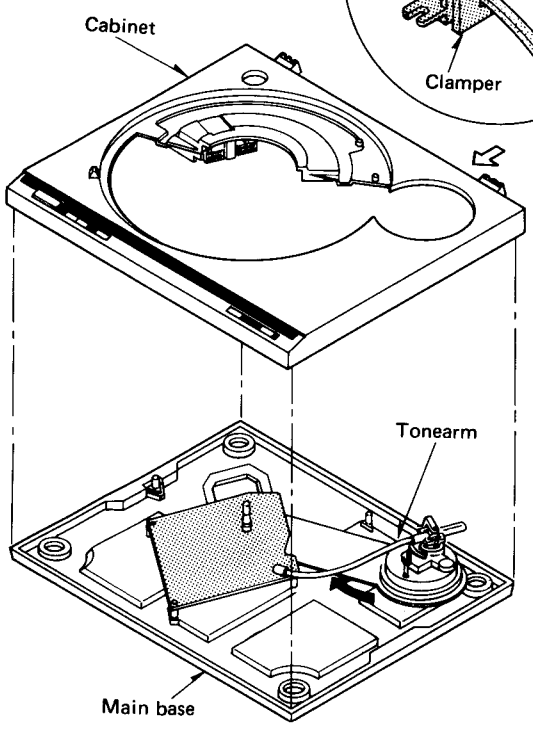


Fig. 3

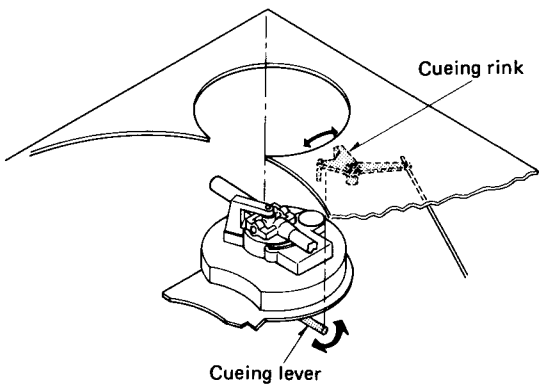


Fig. 4

• How to remove the drive circuit P.C.B. and stator frame

1. Remove the main base and cabinet. **(Refer to "How to remove the main base and cabinet".)**
2. Remove the drive circuit P.C.B. setscrews ⑫ ~ ⑮ . **(See Fig. 5)**
3. Remove the stator frame setscrews ⑯ ~ ⑳ . Remove the regulator transistor (Q3) setscrew ㉑ and connector ㉒ . Then, the drive circuit P.C.B. can be separated from the stator frame. **(See Fig. 5)**
4. When removing the drive circuit P.C.B. and stator frame together, remove the connector ㉒ and setscrews ⑯ ~ ⑳ . **(See Fig. 5)**

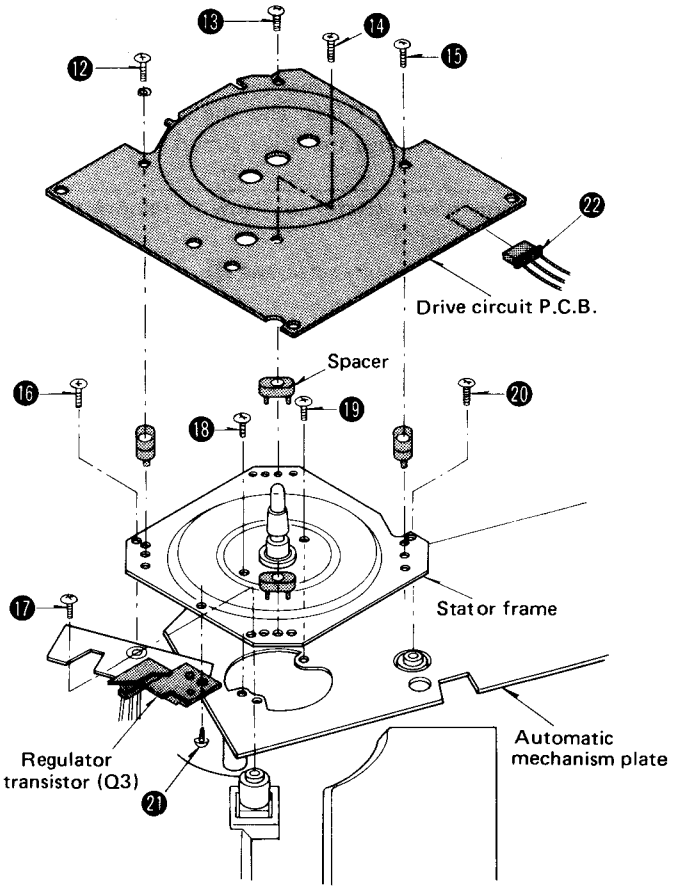


Fig. 5

• How to remove the arm base and tonearm

1. Separate the main base from the cabinet. **(Refer to "How to remove the main base and cabinet".)**
2. Remove the arm base setscrews ㉓ ~ ㉕ . Then, the arm base can be removed. **(See Fig. 6)**
3. When removing the tonearm, turn over the arm base and remove the PU fixing plate setscrew ㉖ and canceller spring. **(See Fig. 7)**
4. Remove the phono output P.C.B. setscrew ㉗ and unsolder the 5 lead wires from the tonearm. **(See Fig. 7)**

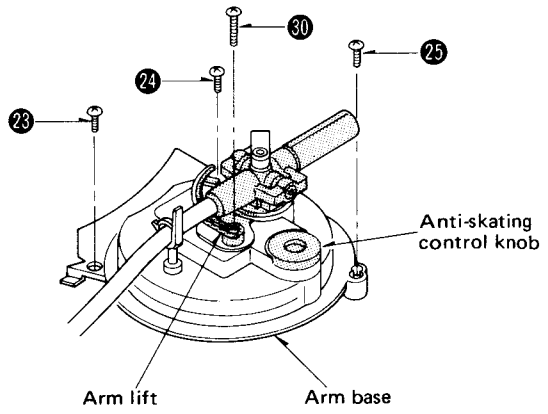


Fig. 6

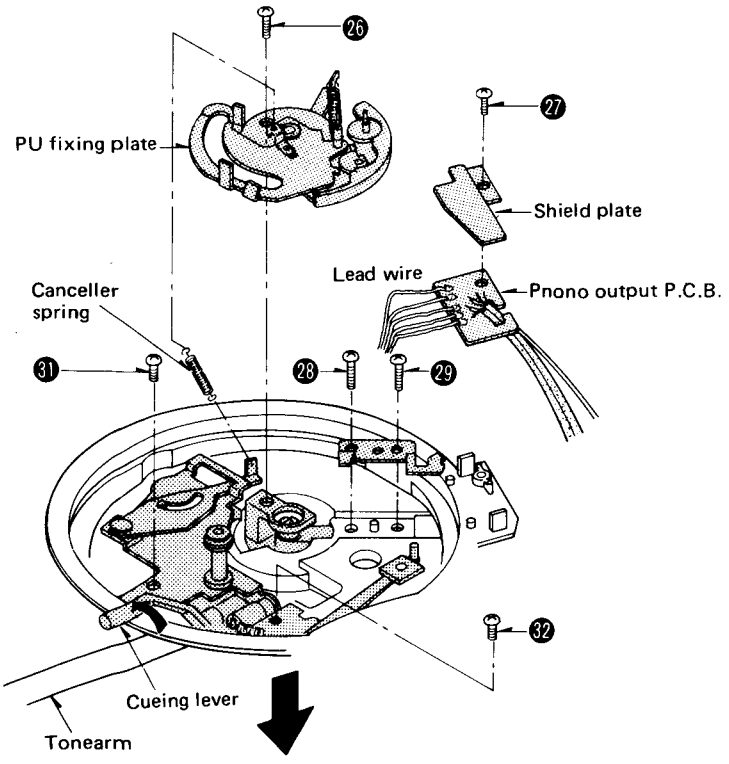


Fig. 7

5. Remove the tonearm setscrews ㉘ and ㉙ . Then, the tonearm can be removed in the direction of the arrow. **(See Fig. 7)**
6. When removing this lift base plate, remove the arm lift setscrew ㉚ before tuning over the arm base, and then remove the arm lift. **(See Fig. 6)**

Note: Remove the spring under the arm lift at the same time.

7. Remove the anti-skating control knob. **(See Fig. 6)**
8. Turn over the arm base and remove the PU fixing plate.
9. Remove the lift base plate setscrews ㉛ and ㉜. Then, the lift base plate can be removed.
10. Before mounting the arm base, make sure that the automatic mechanism is in the initial stage, and then shift the cueing lever of the arm base down in the direction of the arrow in order to make cueing-up. **(See Fig. 7)**

- **How to remove the automatic mechanism plate**

1. Separate the main base from the cabinet. **(Refer to "How to remove the main base and cabinet".)**
2. Remove the drive circuit P.C.B. and the stator frame. **(Refer to "How to remove the drive circuit P.C.B. and stator frame".)**
3. Remove the arm base. **(Refer to "How to remove the arm base and tonearm".)**
4. Remove the mechanism plate setscrews ㉝ ~ ㊱ . Then, the mechanism plate can be removed. **(See Fig. 8)**

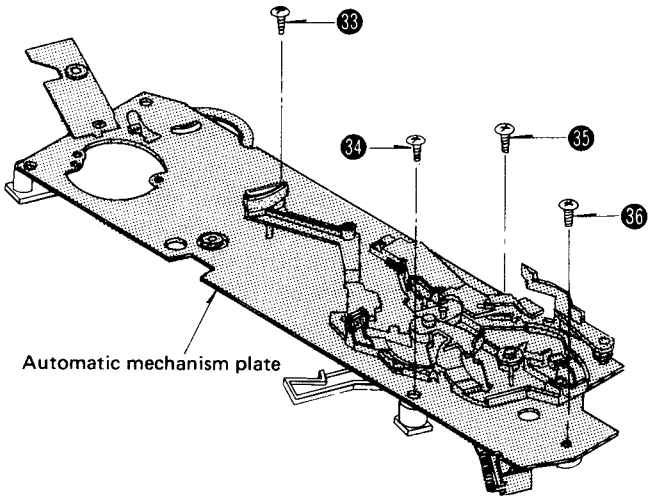


Fig. 8

- **How to replace the electric parts**

1. Remove the panel cover. **(Refer to "How to remove the main base and cabinet".)**
2. Remove the drive circuit P.C.B. setscrews ㊲ ~ ㊵ and connectors ㊶ ~ ㊸ . Remove the drive circuit P.C.B. by lifting it as shown by the arrow. Then, the electric parts can be replaced. **(See Fig. 9)**
   To replace the regulator transistor (Q3), the stator frame must be removed beforehand.

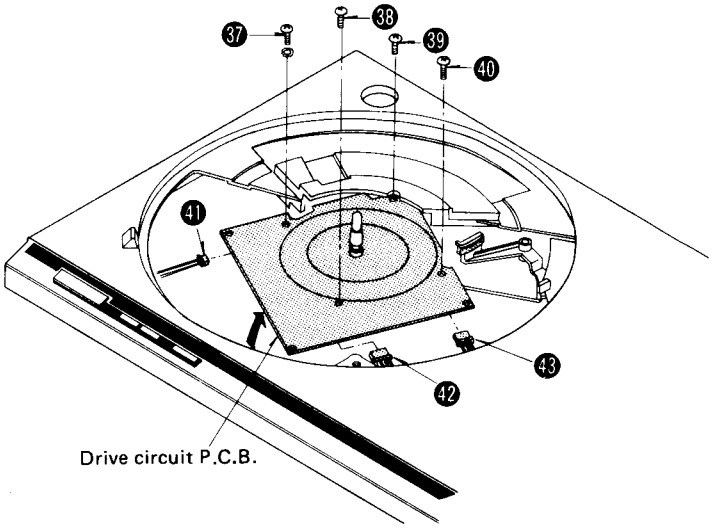


Fig. 9

■ REPLACEMENT OF HALL ELEMENT

When replacing the Hall element, note that the Hall element surface must be faced to the magnet of the turntable.
The legs are allowed to be reverse in position provided that the surface is up. **(See Fig. 10)**

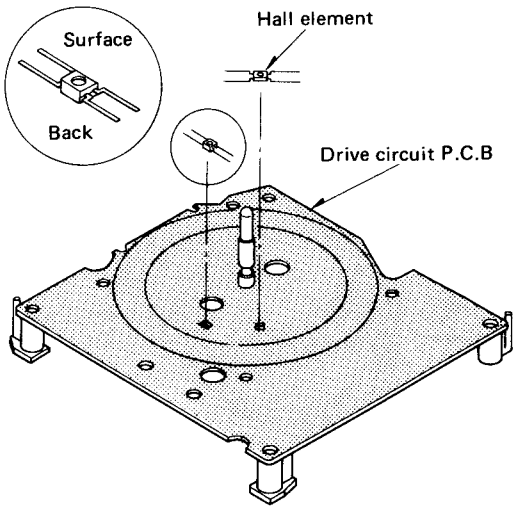


Fig. 10

■ MEASUREMENTS AND ADJUSTMENTS English

• Arm-lift height adjustment

The arm-lift height (distance between the stylus tip and record surface when the cueing control is set to the " ▼ " position) has been adjusted at the factory to approximately 5 mm (3/16"). **(Fig. 11)**

If the clearance is too narrow or too wide (because of different cartridge dimensions, for example), turn the adjustment screw clockwise or counterclockwise.

(See Fig. 12)

Clockwise rotation

—distance between the record and stylus tip is decreassed.

Counterclockwise rotation

—distance between the record and stylus tip is increased.

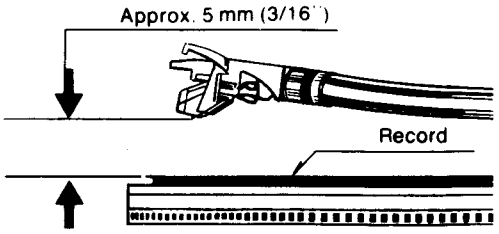


Fig. 11
(Abb. 11)

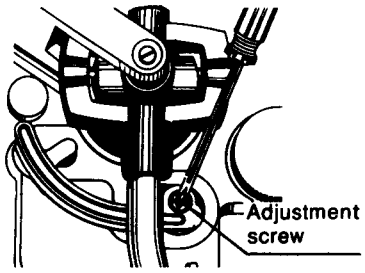


Fig. 12
(Abb. 12)

• Adjustment of automatic start position (Fig. 13)

Note:

The auto-start and auto-return adjustment screw are located together. When the tonearm is in or near the arm rest, the auto-start adjustment screw is visible; **(See Fig. 13)** when the tonearm is near the center of a record, the auto-return adjustment screw is visible. **(See Fig. 14)**

If the stylus does not land in the lead-in groove, adjust as follows.

1. Clamp the tonearm to the arm rest.
2. Take off the rubber cap covering the adjustment screw section.
   Turn the screw with a screwdriver, clockwise or counterclockwise as necessary.
   If the stylus lands too far in,
   —turn counterclockwise.
   If the stylus descends outside the record,
   —turn clockwise.
   Adjust so the stylus tip lands 1 ~ 2mm in from the edge of the record.

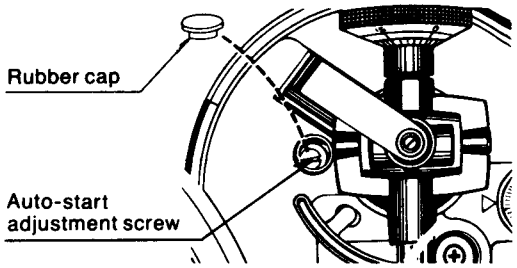


Fig. 13
(Abb. 13)

• Adjustment of automatic return position (Fig. 14)

1. Put the stylus protector on the cartridge.
2. Take off the rubber cap covering the adjustment screw section and move the tonearm toward the center of the record.
   Then, the auto-return position adjustment screw will appear.
   If the tonearm tends to return to the arm rest before the play has finished,
   —turn counterclockwise.
   If the tonearm fails to return after the final groove,
   —turn clockwise.

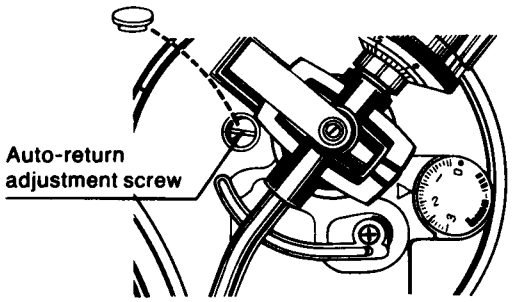


Fig. 14
(Abb. 14)

• Overhang adjustment (Fig. 15)

15 mm is the correct overhang for this tonearm.

Loosen the screws and move the cartridge forward or backward until the distance between the stylus tip and the plug becomes 52 mm (2-3/64").

Tigthen the screws without moving the cartridge.

Adjust the horizontal zero balance, stylus pressure and arm-lift height whenever you change the cartridge.

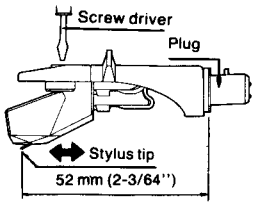


Fig. 15
(Abb. 15)

■ MESSUNGEN UND JUSTIERUNGEN Deutsch

• Justierung der Tonarmlifthöhe

Die Tonarmlifthöhe, d.h. der Abstand zwischen Nadelspitze und Schallplattenoberfläche bei Liftsteuerungs-Position " ▼ ", wurde werkseitig auf ca. 5 mm eingestellt. **(Abb. 11)**

Falls der Abstand zu klein oder zu groß ist (z.B. wegen der unterschiedlichen Tonabnehmer-Abmessungen, drehen Sie die Justierschraube im Uhrzeigersinn oder entgegen dem Uhrzeigersinn. **(Abb. 12)**

Drehung im Uhrzeigersinn

—Der Abstand zwischen der Platte und der Nadelspitze wird kleiner.

Drehung entgegen dem Uhrzeigersinn

—Der Abstand zwischen der Platte und der Nadelspitze wird größer.

• Justierung des Aufsetzpunktes der Automatik (Abb. 13)

Anmerkung:

Die Auto-Start- und die Auto-Rückkehr-Positions-Justierschraube sind zusammen angeordnet. **(Abb. 13)**

Wenn der Tonarm in der Nähe oder auf der Tonarmablage ist, so ist die Auto-Start-Positions-Justierschraube sichtbar.

Wenn der Tonarm in der Nähe der Plattenmitte ist, so ist die Auto-Rückkehr-Positions-Justierschraube sichtbar. **(Abb. 14)**

Wenn die Abtastnadel nicht in der Einlaufrille aufsetzt, justieren Sie wie folgt.

1. Befestigen Sie den Tonarm mit der Arretierklammer auf der Tonarmablage.
2. Die Gummikappe abnehmen.
3. Drehen Sie die Justierschraube im Uhrzeigersinn oder entgegen dem Uhrzeigersinn, wie erforderlich.
   Falls der Aufsetzpunkt im Wiedergabeteil der Schallplatte liegt.
   —Entgegen dem Uhrzeigersinn drehen.
   Falls der Aufsetzpunkt außerhalb der Platte liegt.
   —Im Uhrzeigersinn drehen.
   Justieren Sie so, daß die Nadelspitze 1 – 2 mm vom Rand entfernt auf der Platte aufsetzt.

• Justierung des Abschaltpunktes der Automatik (Abb. 14)

(Die Gummikappe abnehmen)

1. Setzen Sie den Nadelschutz auf den Tonabnehmer auf.
2. Führen Sie den Tonarm gegen die Plattenmitte.
   Die Justierschraube für den Abschaltpunkt der Automatik wird dann sichtbar.
   Falls der Tonarm zu früh zurückkehrt.
   —Entgegen dem Uhrzeigersinn drehen.
   Falls der Tonarm nach Erreichen der Auslaufrille nicht zurückkehrt.
   —Im Uhrzeigersinn drehen.

• Justierung dus Überhangs (Abb. 15)

Der korrekte Überhang für dieses Gerät beträgt 15 mm.

Lösen Sie die Befestigungsschrauben und versetzen Sie den Tonabnehmer vorwärts oder rückwärts, bis der Abstand zwischen dem Stecker und der Nadelspitze 52 mm beträgt.

Ziehen Sie die Befestigungsschrauben an, ohne dabei den Tonabnehmer zu verschieben.

Justieren Sie die horizontale "0"-Balance, die Auflagekraft und die Tonarmlifthöhe nach jedem Auswechseln des Tonabnehmers.

■ MESURAGES ET RÉGLAGES Français

• Mise au point de la hauteur de l'élévateur du bras

La hauteur de l'élévateur du bras (distance entre l'extrémité de la pointe de lecture et la surface du disque, lorsque la commande de pose et de relevage est à la position " ▼ ") a été réglée en usine sur approximativement 5 mm. **(Fig. 11)**

Si l'intervalle est trop étroit ou trop large, (à cause, par exemple, des différentes dimensions de cellules pick-up), tourner la vis de réglage dans le sens des aiguilles d'une montre ou dans le sens inverse. **(Fig. 12)**

Rotation dans le sens des aiguilled d'une montre.

—La distance entre la surface du disque et l'extrémité de la pointe de lecture diminue.

Rotation dans le sens contraire des aiguilles d'une montre.

—La distance entre la surface du disque et l'extrémité de la pointe de lecture augmente.

• Mise au point de la position de démarrage automatique (Fig. 13)

Attention:

Les vis de réglage du démarrage automatique et du retour automatique sont disposées ensemble. **(Fig. 13)**

Lorsque le bras de lecture est sur ou près de l'accoudoir du bras, la vis de réglage de démarrage automatique est visible; lorsque le bras de lecture est près du centre d'un disque, la vis de réglage du retour automatique est visible. **(Fig. 14)**

Si la pointe de lecture ne repose pas dans le sillon d'entrée, ajuster de la manière suivante.

1. Bloquer le bras de lecture sur le support du bras.
2. Retirer le capuchon en caoutchouc.
3. Avec un tournevis, tourner la vis de réglage dans le sens des aiguilles d'un montre ou dans le sens inverse selon la nécessité.
   Si la tête de la pointe de lecture se dépose trop loin du sillon enregistré.
   —Tourner dans le sens contraire des aiguilles d'une montre.
   Si la tête de la pointe de lecture se dépose en dehors du disque.
   —Tourner dans le sens des aiguilles d'une montre.
   Ajuster de façon à ce que l'extrémité de la pointe de lecture atterrisse à 1 — 2 mm à partir du bord du disque.

• Mise au point de la position de retour automatique (Fig. 14)

(Retirer le capuchon en caoutchouc.)

1. Placer le capot protecteur de la pointe de lecture sur la cellule pick-up.
2. Déplacer le bras de lecture vers le centre de disque.
   Alors, la vis de réglage du retour automatique apparaîtra.
   Si le bras de lecture tend à revenir vers le support du bras avant que l'audition ne soit terminée.
   —Tourner dans le sens contraire des aiguilles d'une montre.
   Si le bras de lecture ne peut revenir en arrière après le dernier sillon.
   —Tourner dans le sens des aiguilles d'une montre.

• Réglage du surplomb (Fig. 15)

Le surplomb approprié pour ce bras de lecture est de 15 mm.

Desserrer les vis et déplacer la cellule vers l'avant ou vers l'arrière jusqu'à ce que la distance entre l'extrémité de la pointe de lecture et la fiche soit de 52 mm.

Serrer les vis sans faire bouger la cellule.

Mettre au point l'équilibrage zéro horizontal, la force verticale d'appui de la pointe de lecture et la hauteur du bras élévateur chaque fois que vous changez de cellule.

■ MEDICIONES Y AJUSTES — Español

• Ajuste de la altura de elevación del brazo

La altura de elevación del brazo (o sea, la distancia entre la punta de la aguja y la superficie del disco cuando el control de colocación está en la posición " ▼ ") ha sido regulada en la fábrica aproximadamente a 5 mm. **(Fig. 11)**

En caso que el espacio libre fuese demasiado estrecho o demasiado abundante (debido, por ejemplo, a la diferencia en dimensiones de los cartuchos), girar el tornillo de ajuste hacia la derecha o hacia la izquierda. **(Fig. 12)**

Rotación hacia la derecha
—reduce la distancia entre el disco y la punta de la aguja.

Rotación hacia la izquierda
—aumenta la distancia entre el disco y la punta de la aguja.

• Ajuste de la posición para el arranque automático (Fig. 13)

Nota:

Los respectivos tornillos de ajuste para arranque y retorno automáticos se encuentran juntos. **(Fig. 13)**

Cuando el brazo sonoro está puesto sobre el apoyo o cerca de éste, se dejará ver el tornillo de ajuste del arranque automático; estando cerca del centro del disco, se dejará ver el de ajuste del retorno automático. **(Fig. 14)**

En caso que la aguja no se depositara en el surco de comienzo, regular de la manera que sigue.

1. Sujetar el brazo sonoro al apoyo del mismo con la grapa.
2. Quitar la tapita de goma.
3. Girar el tornillito de ajuste hacia la derecha o hacia la izquierda usando un destornillador, según sea necesario.
   En caso que la punta de la aguja se deposita muy dentro del surco grabado:
   —Girar hacia la izquierda.
   En caso que la punta de la aguja se deposita fuera del disco:
   —Girar hacia la derecha.
   Regular de manera tal que la punta de la aguja se deposite a uno o dos milímetros del borde del disco.

• Ajuste de la posición para retorno automático (Fig. 14)

(Quitar la tapita de goma.)

1. Colocar la protección de la aguja en el cartucho.
2. Mover el brazo sonoro hacia el centro del disco.
   Con ello, aparecerá el tornillo de ajuste del retorno automático.
   Cuando el brazo sonoro tienda a volver a su apoyo antes de terminar la ejecución:
   —Girar hacia la izquierda.
   En caso que el brazo sonoro no vuelva después de haber tocado el último surco del disco:
   —Girar hacia la derecha.

• Ajuste de la proyección (Fig. 15)

La proyección correcta para este cartucho es de 15 mm.

Aflojar los tornillos y mover el cartucho para adelante y para atrás hasta que la distancia entre la punta de la aguja y la clavija sea de 52 mm.

Apretar los tornillos sin mover el cartucho.

Regular el equilibrio horizontal a cero, la presión de la aguja y la altura de elevación del brazo toda vez que se cambia el cartucho.

■ CARTRIDGE INSTALLATION

When installing a cartridge, follow the instructions that came with the cartridge.

1. Connect the lead wires to the cartridge terminals.
   The terminals of most cartridges are color coded.
   Connect each lead wire to the terminal of the same color.
   White (L+) . . . . . **Left channel** +
   Blue (L—) . . . . . **Left channel** —
   Red (R+) . . . . . **Right channel** +
   Green (R—) . . . . . **Right channel** —
2. Mount the cartridge in the headshell using the screws provided with the cartridge. **(Fig. 16)**

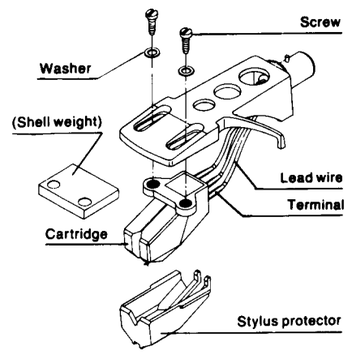


Fig. 16

■ ABOUT CARTRIDGE WEIGHT

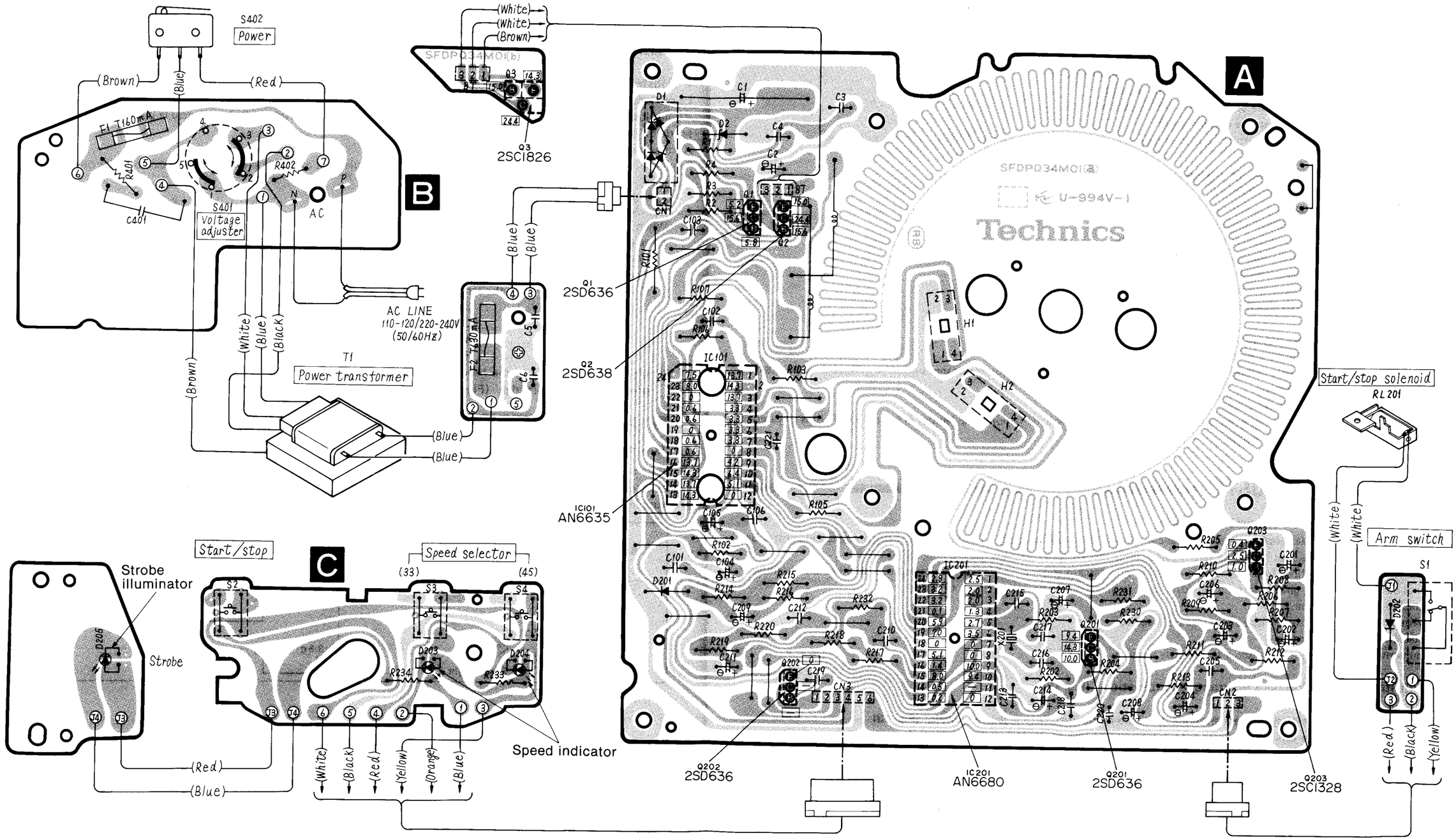
(See chart below)

Cartridges weighing between 3.5 and 7.5 g can be used on this tonearm (with the headshell and accessory shell weight supplied).

Supplied headshell in combination with other parts.	Allowable cartridge weight. (Included the cartridge mounting screws) 4 g 5 6 7 8 9 10 11
A) Headshell only (7.5 g)	5 g — 7.5 g
B) + Shell weight	3.5 g — 5 g

■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines



■ SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with the development of new technolgy.)

1 2 3 4 5 6 7 8 9 10

A B C D E F

Operation circuit

C

RL201
S2
Start/Stop
Speed Selector (45) (33)
S4
S3
S1
Arm Switch
D202
R233 2.2K
D204
D203
R234 180
D205 Strobe
D205 SVDEBR5505S
D202 SVDRMIZ
D203, 204 SVDPR5531K
CN2
CN3

Turntable drive circuit

A

Q203 2SC1328
D201 MA150
Q2 2SD638
Q1 2SD636
Q3 2SC1826
IC201 AN6680
IC101 AN6635
Q202
Q201
D2 MA1051A
Q201, 202 2SD636
D1 SVDSIRBA20Z
H1, 2 OH-001
H1
H2
FG

Power source circuit

B

CN1
F2 T630mA
T1
S402 Voltage adjuster
Power S402
F1 T160mA
AC LINE 110-120/220-240V (50/60Hz)
AC 25V

Notes:

1. **S1**
2. **S2**
3. **S3, 4**
4. **S401**
5. **S402**
6. The valu measured the basis Therefor ing on t condition
7. ▬
8. Importan Compon When rep

● **Refere**
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IC101 (A

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IC201 (A

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⑧	
⑨	

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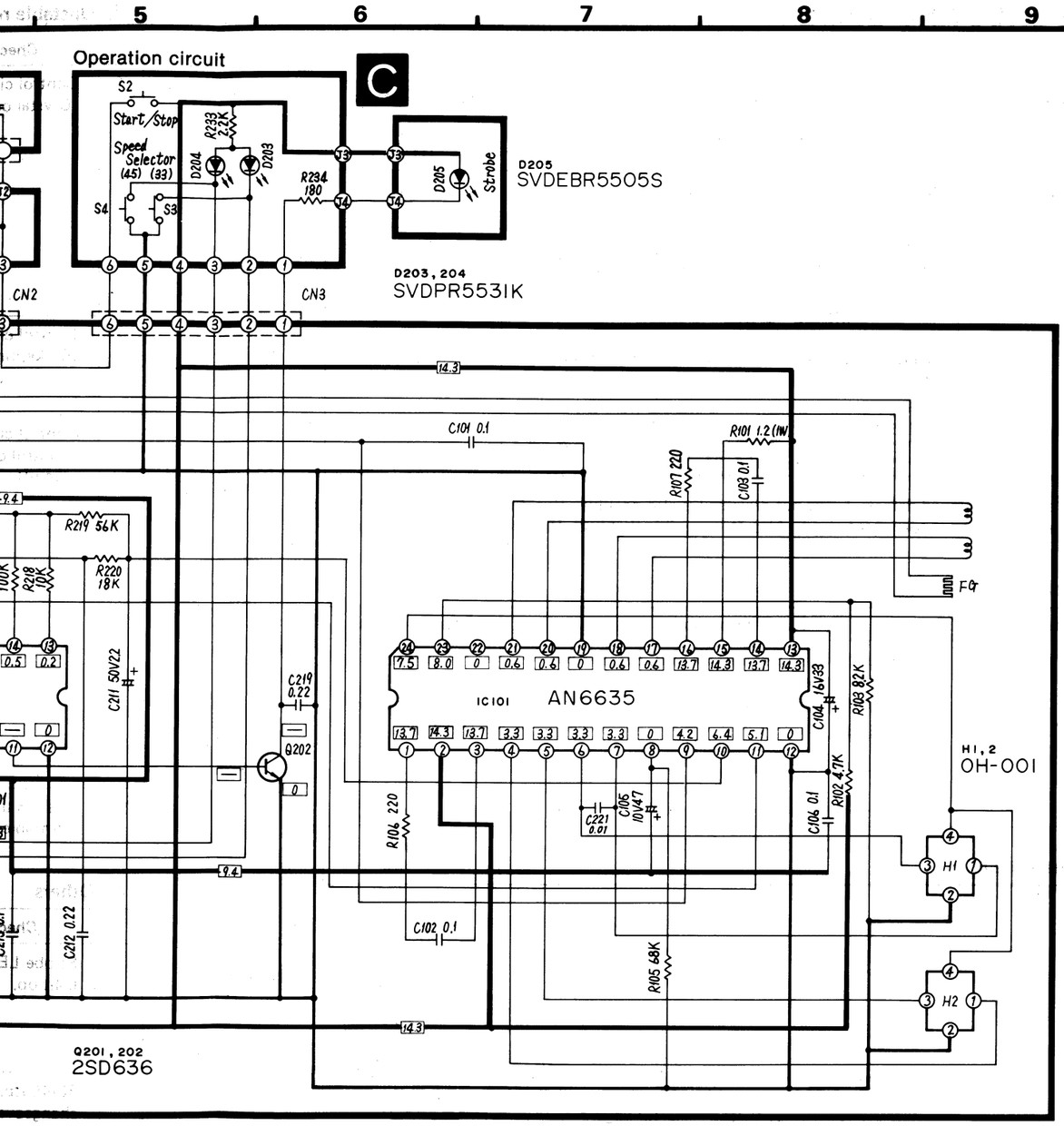
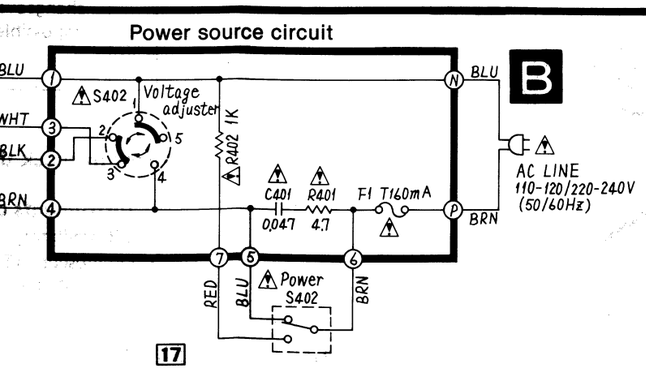
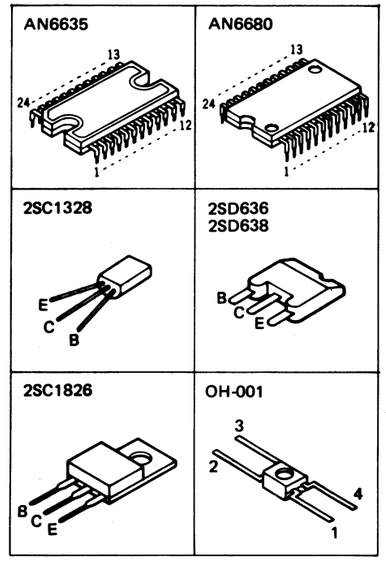




Notes:

1. **S1** : Arm switch in "**on**" position.
2. **S2** : Start/stop switch in "**off**" position. (not push condition)
3. **S3, 4** : Speed selector switch in "**off**" position. (not push condition)
   S3 . . . . 33-1/3 r.p.m. S4 . . . . 45 r.p.m.
4. **S401** : Voltage adjuster switch in "**220 – 240V**" position. 110 – 120 ⟷ 220 – 240V
5. **S402** : Power switch in "**on**" position.
6. The value in ☐ is the reference voltage at stop of turntable, measured by DC electronic circuit tester (high-impedance) on the basis of chassis. (S1 . . . . "on")
   Therefore, the measured value may include some error depending on the internal impedance of DC circuit tester and other conditions.
7. ▬ + Ⓑ voltage line.
8. Important safety Notice:
   Components identified by ⚠ mark have special characteristics important safety.
   When replacing any of these compornents, use only manufacturer's specified parts.

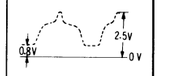
• Terminal guide of transistors and IC's



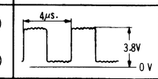
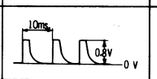
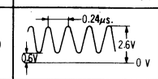
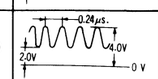
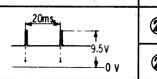
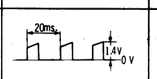
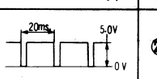
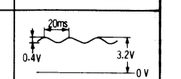
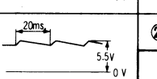
• Reference voltage and waveform at each IC terminal (pin)

This indicated voltage values and waveform are measured by oscilloscope at 33 r.p.m. rotation.

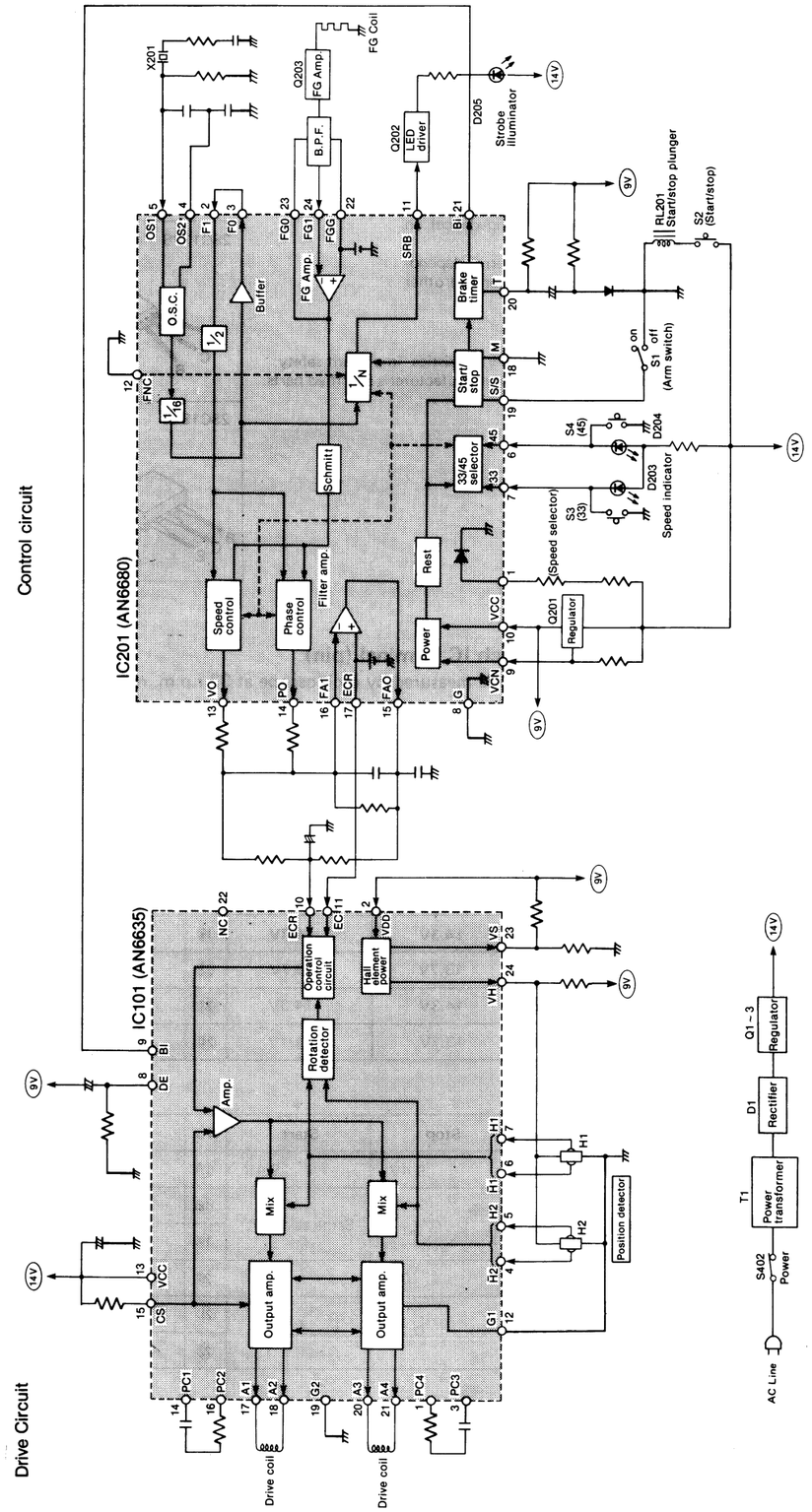
IC101 (AN6635)

No.	Stop	Start	No.	Stop	Start	No.	Stop	Start
①	13.7V	13.7V	⑨	0.1V	4.2V	⑰	0.6V	
②	14.3V	14.3V	⑩	6.4V	5.2V	⑱		
③	13.7V	13.7V	⑪	5.1V	5.1V	⑳		
④	3.3V	3.3V	⑫	0V	0V	㉑		
⑤	3.3V	3.3V	⑬	14.3V	14.3V	⑲	0V	0V
⑥	3.3V	3.3V	⑭	13.7V	13.7V	㉒	0V	0V
⑦	3.3V	3.3V	⑮	14.3V	14.3V	㉓	8.0V	7.9V
⑧	0V	0V	⑯	13.7V	13.7V	㉔	7.5V	7.5V

IC201 (AN6680)

No.	Stop	Start	No.	Stop	Start	No.	Stop	Start
①	2.5V	2.5V	⑩	9.4V	9.4V	⑰	5.1V	5.1V
② ③		Same as at left	⑪		Same as at left	⑱ ⑲	0V 0V	0V 7.0V
④		Same as at left	⑫	0V	0V	⑳	5.9V	0.2V
⑤		Same as at left	⑬	0.2V		㉑ ㉒	0.1V 3.2V	4.2V 3.0V
⑥	3.5V (45r.p.m. . . 0V)	3.5V (45r.p.m. . . 0V)	⑭			㉓	3.2V	
⑦	0V (45r.p.m. . .4.0V)	0V (45r.p.m. . .4.0V)	⑮	8.0V		㉔	2.8V	3.0V
⑧	0V	0V						
⑨	10.0V	10.0V	⑯	1.4V	5.2V			

■ BLOCK DIAGRAM



■ TROUBLE SHOOTING GUIDE

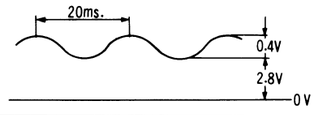
1. No rotation

	Check point	Checking method	Possible defects
1	Power supply circuit	Q3 emitter voltage ⟶ 14.3V	Q1 ~ 3 D1, 2
2	Constant voltage circuit	Q201 emitter voltage ⟶ 9.4V	Q201
3	Control circuit (S/S circuit)	With arm switch (S1) turned on/off, the voltage changes of IC201 terminal ⑲ are as follows: S1 "on" ⟶ 7.0V "off" ⟶ 0V	S1 IC201
4	Drive circuit	Voltage at each terminal of IC101 (in start mode) (S1 . . . . . "on")	IC101

Terminal	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
Voltage	13.7	9.4	13.6	3.3	3.3	3.3	3.3	0	4.2	6.4	5.1	0
Terminal	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔
Voltage	14.3	13.7	14.3	13.6	0.6	0.6	0	0.6	0.6	0	8.0	7.5

Note: Besides the above-mentioned defects, burnt-out drive coil is also possible. But if it is on one phase, the motor rotates although the driving torque is halved. Also, it is possible that both Hall elements are defective.

2. Abnormal rotation

	Check point	Checking method	Possible defects
1	FG amplifier circuit	Solder lead wire to terminal ㉓ of IC201; remove it from the bottom plate and measure the waveform in the state of rotation. **(See Fig. 17)** 	Q203 IC201 FG coil pattern breakage
2	Control circuit (Reference voltage circuit)	Voltage of IC201 terminal ⑰ 5.1V	IC201

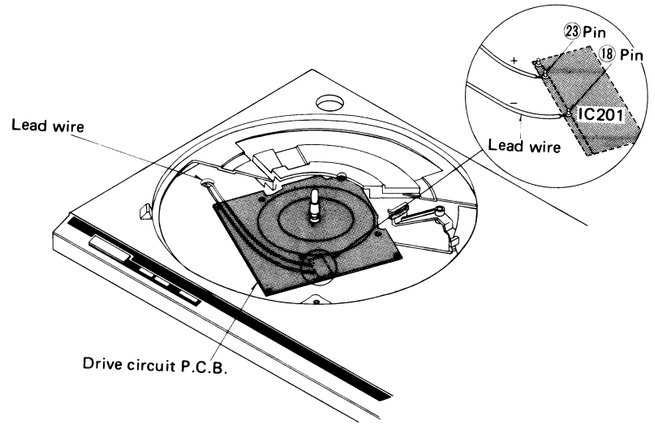


Fig. 17

3. Unstable

	Ch
1	Control (Crysta
2	Control (Brake,
3	Control (Contro circuit

Note: Besides turntab

4. Others

	Ch
1	Strobe light up
2	33/45 r changed impossi

•How to check

Instruments

1. CR oscillator
2. Oscilloscope
3. 50V 1μF elec

■ TROUBLE SHOOTING GUIDE

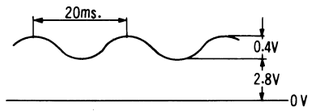
1. No rotation

	Check point	Checking method	Possible defects
1	Power supply circuit	Q3 emitter voltage ⟶ 14.3V	Q1 ~ 3 D1, 2
2	Constant voltage circuit	Q201 emitter voltage ⟶ 9.4V	Q201
3	Control circuit (S/S circuit)	With arm switch (S1) turned on/off, the voltage changes of IC201 terminal ⑲ are as follows: S1 "on" ⟶ 7.0V "off" ⟶ 0V	S1 IC201
4	Drive circuit	Voltage at each terminal of IC101 (in start mode) (S1 . . . . . "on")	IC101

Terminal	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
Voltage	13.7	9.4	13.6	3.3	3.3	3.3	3.3	0	4.2	6.4	5.1	0
Terminal	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔
Voltage	14.3	13.7	14.3	13.6	0.6	0.6	0	0.6	0.6	0	8.0	7.5

Note: Besides the above-mentioned defects, burnt-out drive coil is also possible. But if it is on one phase, the motor rotates although the driving torque is halved. Also, it is possible that both Hall elements are defective.

2. Abnormal rotation

	Check point	Checking method	Possible defects
1	FG amplifier circuit	Solder lead wire to terminal ㉓ of IC201; remove it from the bottom plate and measure the waveform in the state of rotation. **(See Fig. 17)** 	Q203 IC201 FG coil pattern breakage
2	Control circuit (Reference voltage circuit)	Voltage of IC201 terminal ⑰ 5.1V	IC201

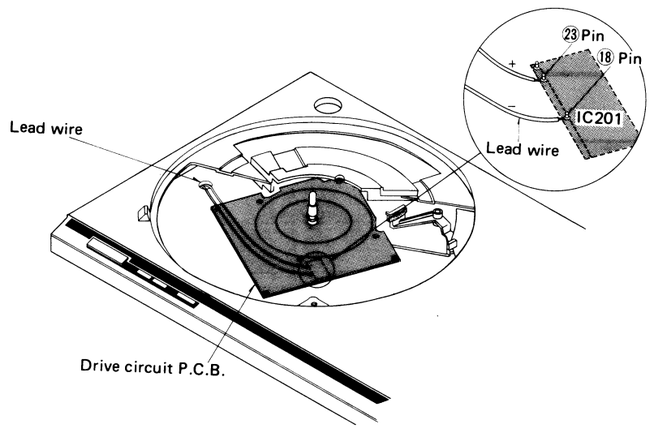
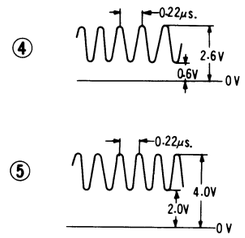
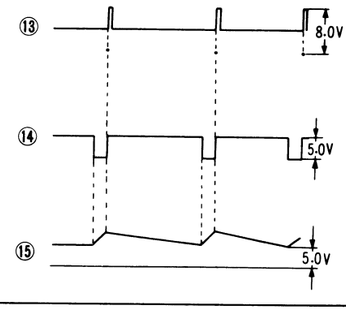


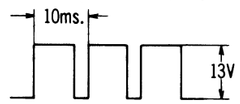
Fig. 17

3. Unstable rotation (Uneven rotation, repeat of normal and reverse rotations)

	Check point	Checking method	Possible defects
1	Control circuit (Crystal oscillator)	Measure the waves at IC201 terminals ④ and ⑤. 	X201 IC201
2	Control circuit (Brake, timer circuit)	Voltage at IC201 terminals ⑳ and ㉑. (S1 . . . . . "on") ⑳ ⟶ 5.9V ㉑ ⟶ 4.2V	IC201 IC101
3	Control circuit (Control output circuit)	Instead of FG signal, apply FG signal by CR oscillator, **(Refer to "How to check the control circuit.)** Measure the waves at IC201 terminals ⑬, ⑭, ⑮. 	IC201

Note: Besides the above, it is possible that Hall elements are defective. In this case, the symptom may be that the turntable reversely rotates because the turntable position cannot be detected.

4. Others

	Check point	Checking method	Possible defects
1	Strobe LED does not light up.	Q202 collector output waveform. 	D205 Q202
2	33/45 r.p.m. changeover is impossible.	Voltage at IC201 terminals ⑥ and ⑦.	IC201 S3, 4

Terminal \ Speed	33	45
⑥	3.5V	0V
⑦	0V	4.0V

•How to check the control circuit

Instruments used

1. CR oscillator
2. Oscilloscope (Two channel type)
3. 50V 1μF electrolytic condenser

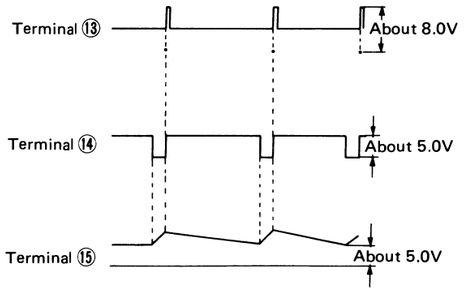
Setting

1. Remove the turntable and panel cover. **(Refer to "Disassembly instructions".)**
2. Remove the connector (CN2) from the arm switch.
3. Unsolder the positive ⊕ side of C203.

Checking procedure

1. Solder the condenser to the negative ⊖ side of C203, and connect the CR oscillator to it.
   Or, connect the oscillator to the positive ⊕ side of C203. **(See Fig. 18)**
2. Checking the output of the oscillator on the oscilloscope, adjust so that the waveform becomes as shown below.

3. Measure the waves at terminals ⑬ , ⑭ , ⑮ of IC201.
   When the output waveforms are as shown below, the control circuit is normal.
   However, because of ther stability of the CR oscillator, the waveforms are not the same as those in normal rotation.



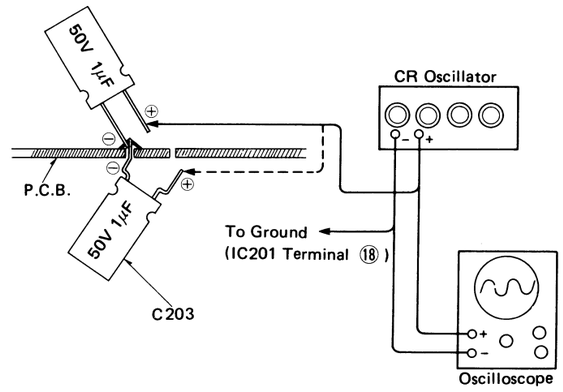


Fig. 18

■ REPLACEMENT PARTS LIST...Electrical Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
Components indentified by ⚠ make have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101		AN6635	IC, Drive
IC201		AN6680	IC, Control
TRANSISTORS			
Q1, 201, 202		2SD636	Transistor, Regulator & Switching
Q2		2SD638	Transistor, Regulator
Q3		2SC1826	Transistor, Regulator
Q203		**2SC1328–T**	Transistor, FG Amplifier
DIODES			
D1	⚠	SVDS1RBA20Z	Diode, Rectifier
D2		MA1051A	Diode, 5.1V Zener
D201		**MA162A**	Diode
D202		SVDRM1Z	Diode
D203, 204		SVDPR5531K	Light Emitting Diode, Speed Indicator (Red)
D205		SVDEBR5505S	Light Emitting Diode, Strobe
HALL ELEMENT			
H1, 2		OH-001	Hall Element, Turntable Position Detector
CRYSTAL			
X201		SVQU306115	Crystal, 4.19328MHz Counter Oscillator

Ref. No.		Part No.	Part Name & Description
SOLENOID			
RL201		SFDZQ34N01Z	Solenoid Ass'y, Start/Stop
SWITCHES			
S1		SFDSAH2985	Switch, Arm (Rest) Switch
S2 ~ 4		EVQQJR02K	Switch, Start/Stop & Speed Selector
S401	⚠	SFDSHXW0225	Switch, Voltage Adjuster
S402	⚠	SFDSQ34N05R	Switch, Power Source
FUSES			
F1	⚠	XBAS2C016T1W	Fuse, T 0.16A 250V
F2	⚠	XBA2C06TR0	Fuse, T 0.63A 250V
POWER TRANSFORMER			
T1	⚠	SLT57P24E	Transformer, Power Source
RESISTORS			
R1		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R2		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R3		**ERD25FJ822**	Carbon, 1/4W, 8.2kΩ, ± 5%
R4		**ERD25FJ272**	Carbon, 1/4W, 2.7kΩ, ± 5%
R101		**ERX1ANJ1R2**	Metal Oxide, 1W, 1.2Ω, ± 5%
R102		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ± 5%
R103		**ERD25FJ822**	Carbon, 1/4W, 8.2kΩ, ± 5%
R105		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ± 5%
R106, 107		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R202		**ERD25FJ391**	Carbon, 1/4W, 390Ω, ± 5%

Ref. No.		Part No.	Part Name & Description
R203		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R204		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ± 5%
R205		**ERD25FJ470**	Carbon, 1/4W, 47Ω, ± 5%
R206		**ERD25TJ154**	Carbon, 1/4W, 150kΩ, ± 5%
R207		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R208		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R209		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R210		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R211		**ERD25FJ471**	Carbon, 1/4W, 470Ω, ± 5%
R212		**ERD25TJ124**	Carbon, 1/4W, 120kΩ, ± 5%
R213		**ERD25FJ272**	Carbon, 1/4W, 2.7kΩ, ± 5%
R214		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R215		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R216		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ± 5%
R217		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R218		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R219		**ERD25TJ563**	Carbon, 1/4W, 56kΩ, ± 5%
R220		**ERD25TJ183**	Carbon, 1/4W, 18kΩ, ± 5%
R230		**ERD25FJ181**	Carbon, 1/4W, 180Ω, ± 5%
R231		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R232		**ERD25TJ224**	Carbon, 1/4W, 220kΩ, ± 5%
R233		**ERD25FJ222**	Carbon, 1/4W, 2.2kΩ, ± 5%
R234		**ERD25FJ181**	Carbon, 1/4W, 180Ω, ± 5%
R401	⚠	**ERD50FJ4R7**	Carbon, 1/2W, 4.7Ω, ± 5%
R402	⚠	**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%

Ref. No.		Part No.	Part Name & Description
CAPACITORS			
C1		**ECEB1HS471**	Electrolytic, 50V, 470μF
C2		**ECEA25Z4R7**	Electrolytic, 25V 4.7μF
C3, 4	⚠	ECKD1H223ZF	Ceramic, 50V, 0.022μF, +100 −0%
C5, 6	⚠	ECKD1H102KB	Ceramic, 50V, 0.001μF, ± 10%
C101, 102		ECQM1H104KZ	Polyester, 50V, 0.1μF, ± 10%
C103		ECQM1H104KZ	Polyester, 50V, 0.1μF, ± 10%
C104		**ECEA1CS330**	Electrolytic, 16V, 33μF
C105		**ECEA1AS470**	Electrolytic, 10V, 47μF
C106		ECKF1E104ZV	Ceramic, 25V, 0.1μF, +80 −20%
C201		**ECEA1CS330**	Electrolytic, 16V, 33μF
C202, 203		**ECEA50Z1**	Electrolytic, 50V, 1μF
C204		**ECEA50Z1**	Electrolytic, 50V, 1μF
C205		ECQM1H473KZ	Polyester, 50V, 0.047μF, ± 10%
C206		**ECEA1ES470**	Electrolytic, 25V, 47μF
C207		**ECEA50Z1**	Electrolytic, 50V, 1μF
C208		**ECEA0JS471**	Electrolytic, 6.3V, 470μF
C209		**ECEA1AS470**	Electrolytic, 10V, 47μF
C210		ECQV05224JZ	TF, 50V, 0.22μF, ± 5%
C211		**ECEA50Z2R2**	Electrolytic, 50V, 2.2μF
C212		ECQV05224JZ	TF, 50V, 0.22μF, ± 5%
C213		ECKF1E104ZV	Ceramic, 25V, 0.1μF, +80 −20%
C214		**ECEA1ES470**	Electrolytic, 25V, 47μF
C215		ECCD1H471K	Ceramic, 50V, 470pF, ± 10%
C216		ECCD1H330K	Ceramic, 50V, 33pF, ± 10%
C217		ECCD1H151K	Ceramic, 50V, 150pF, ± 10%
C218		ECKF1E104ZV	Ceramic, 25V, 0.1μF, +80 −20%
C219, 220		ECQV05224JZ	TF, 50V, 0.22μF, ± 5%
C221		ECQM1H103KZ	Polyester, 50V, 0.01μF, ± 10%
C401 [Other Areas]	⚠	ECQE2A473MZ	Polyester, 250VAC, 0.047μF, ± 20%
C401 [E, EK, XL]	⚠	ECQU2A473MF	Polyester, 250VAC, 0.047μF, ± 20%

Areas

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* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EF] is available in France.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [EH] is available in Holland.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.

■ REPLACEMENT PARTS LIST
...Cabinet, Chassis and Packing Parts

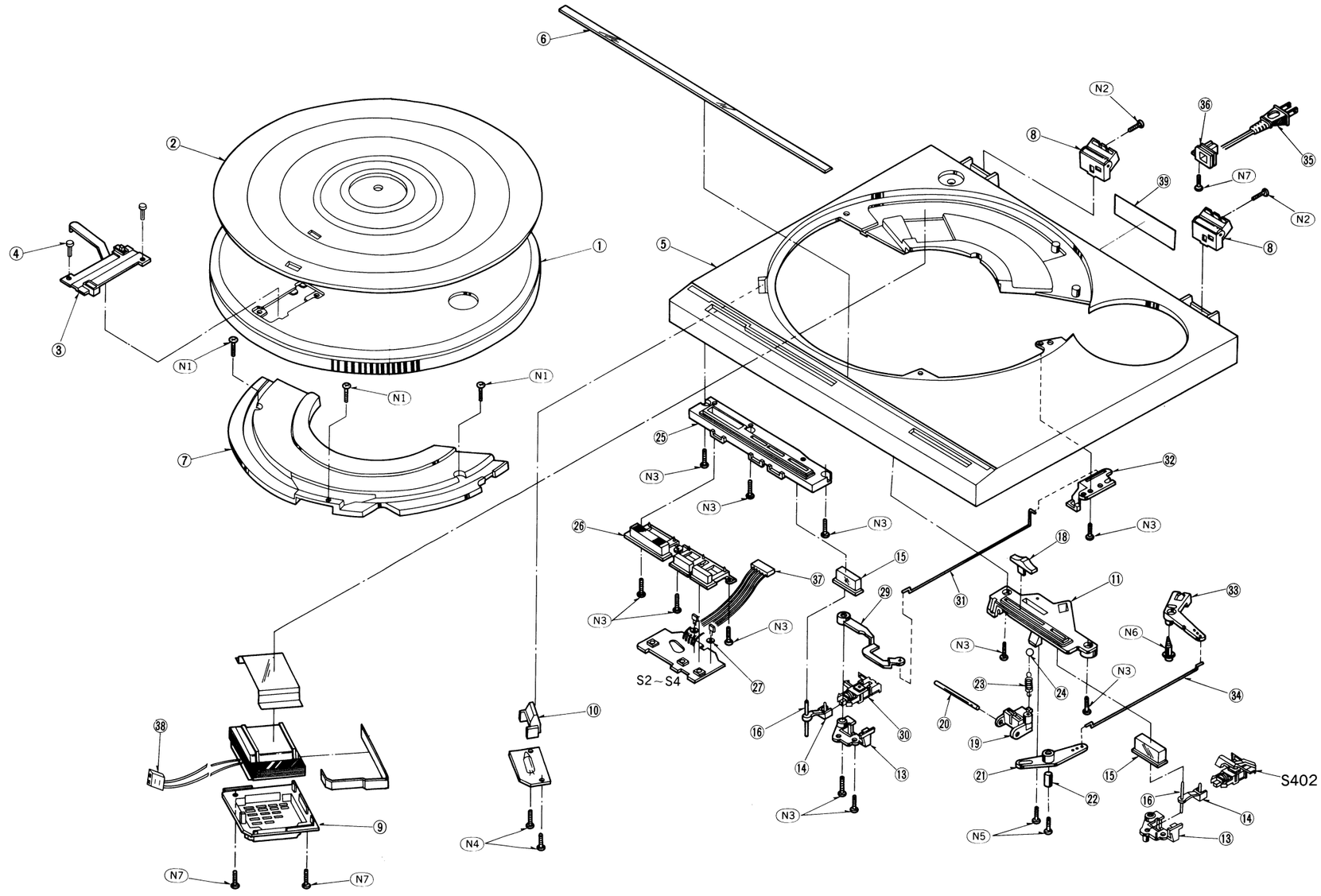
Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
   Components indentified by ⚠ make have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. [K]-marked parts are used for black type only, while ○-marked parts are for silver type only.
4. Parts other than [K] and ○-marked ard used for both black and silver types.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Black type model No. : SL-Q303 (K)

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1		SFTEQ34N01E	Turntable
2		SFTGQ34N01	Turntable Mat
3		SFUMQ34N01E	Base, Disc Size Sensor
4		SFUZD33–01E	Latch, Disc Size Sensor Base
5	○	SFACQ34N01	Cabinet (Silver)
5	[K]	SFACQ34N21	Cabinet (Black)
6		SFKKQ34G01	Surface Plate
7		SFUMQ34N22	Cover, Panel
8		SFATQ34N01A	Hinge
9		SFUMQ34N06	Cover, Transformer
10		SFUMQ11N09	Cover, Neon Lamp Strobe
11		SFUMQ34N02	Guide, Power Switch
13		SFUMQ34N12	Plate, Power/Repeat Switch
14		SFUMQ34N13	Plate, Power/Repeat Knob
15		SFKTQ34N02	Knob, Power/Repeat
16		SFXJQ34N02	Shaft, Power/Repeat
17		SFQAD20–01	Spring, Power/Repeat
18		SFKTQ34N01	Knob, Cueing
19		SFUMQ34N23	Slider, Cueing
20		SFXJQ34N01	Shaft Guide
21		SFUMQ34N04	Rink, Cueing (A)
22		SFXOQ34N01	Pipe, Cueing
23		SFQA130–11	Spring, Cueing
24		SFYB–5–32	Ball, Cueing
25		SFUMQ34N03	Guide, Start/Stop Switch
26		SFKTQ34N03	Knob, Start/Stop Switch
27		SFGZD11N01	Spacer, LED Speed
29		SFUMQ34N05	Rink, Repeat
30		SFDSQ34N01	Switch, Repeat
31		SFUZQ34N01	Rod, Repeat
32		SFUMQ34N21	Guide, Repeat
33		SFUMQ34N11	Rink, Cueing (B)
34		SFUZQ34N02	Rod, Cueing
35 [XL]	⚠	SJA141	AC Cord
35 [EK]	⚠	SJA139	AC Cord
35 [Other Areas]	⚠	SJA137	AC Cord
36 [XL]		SFUMQ34N09	Bushing, AC Cord
36 [Other Areas]		SFUMQ34N10	Bushing, AC Cord
37		SFDJQ34N03E	Connector Ass'y 6P
38		SFDJQ34N04E	Connector Ass'y 2P
39 [E]		SFNNQ34S01	Name Plate
39 [EK, XL, XM]		SFNNQ34G01	Name Plate
39 [XA]		SFNNQ34X01	Name Plate
39 [Other Areas]		SFNNQ34R01	Nema Plate
40		SFADQ34N01E	Dust Cover
MAIN BASE and TONE ARM PARTS			
50		SFAUQ34N01	Bottom Board
51		SFUMQ34N08	Supporter, Mechanism Plate (A)
52		SFUMQ34N14	Supporter, Mechanism Plate (B)
53		SFUMQ34N15	Supporter, Drive P.C.B.
54		SFUMQ34N16	Supporter, Clamper
55		SFUPQ34N01	Cover, Gear
56		SFUZQ34N06E	Latch, Gear Cover
57		SFMZQ34N04	Spacer, Driver P.C.B.
58		SFGAQ34N01	Rubber Insulator
59		SFQHQ34N01	Spring, Insulator Front & Rear Left
61		SFQHQ34N03	Spring, Insulator Rear Right
62		SFUMQ34N07E	Foot, Insulator
105		SFMZQ34N01A	Stater Frame Ass'y

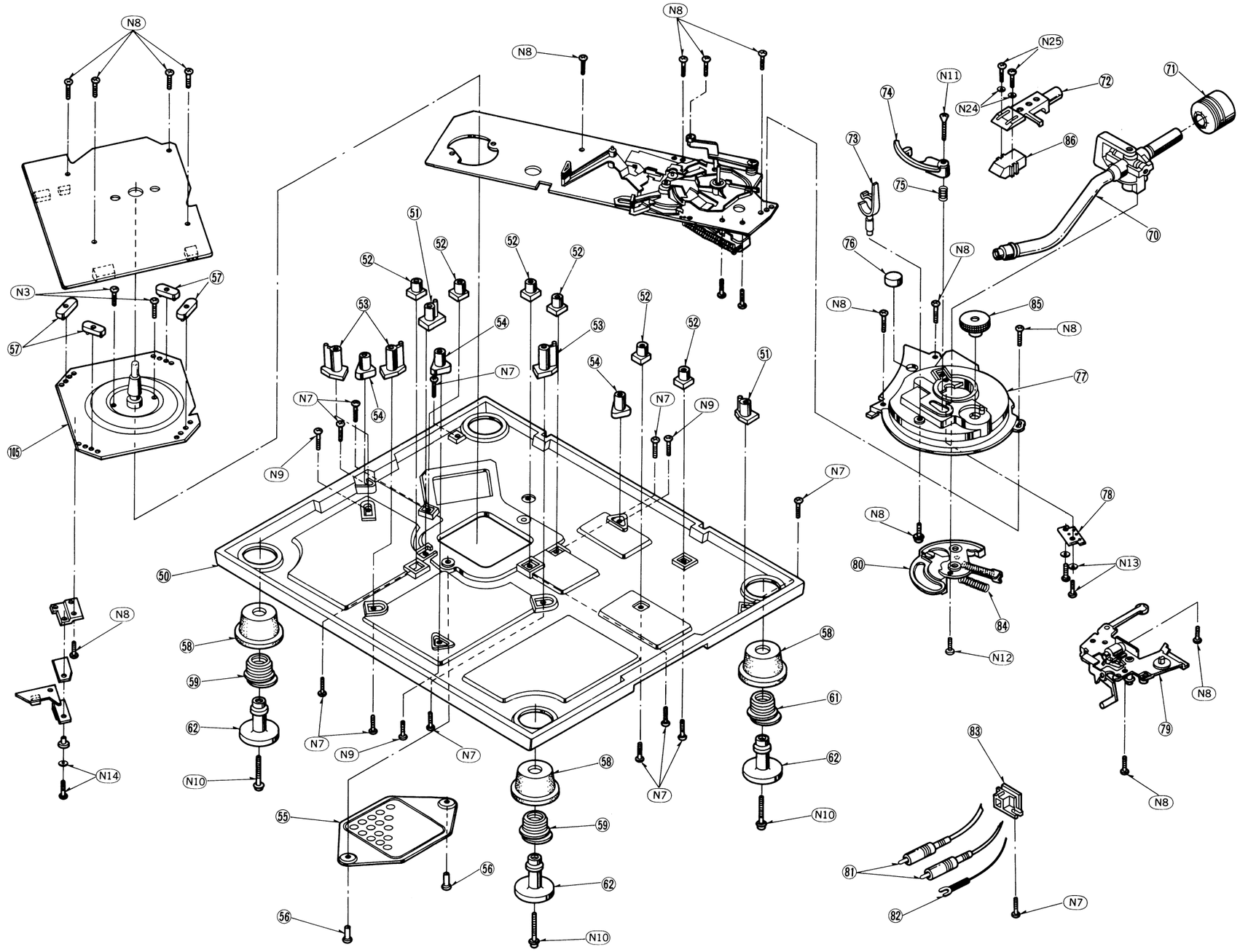
■ EXPLODED VIEWS.....Cabinet



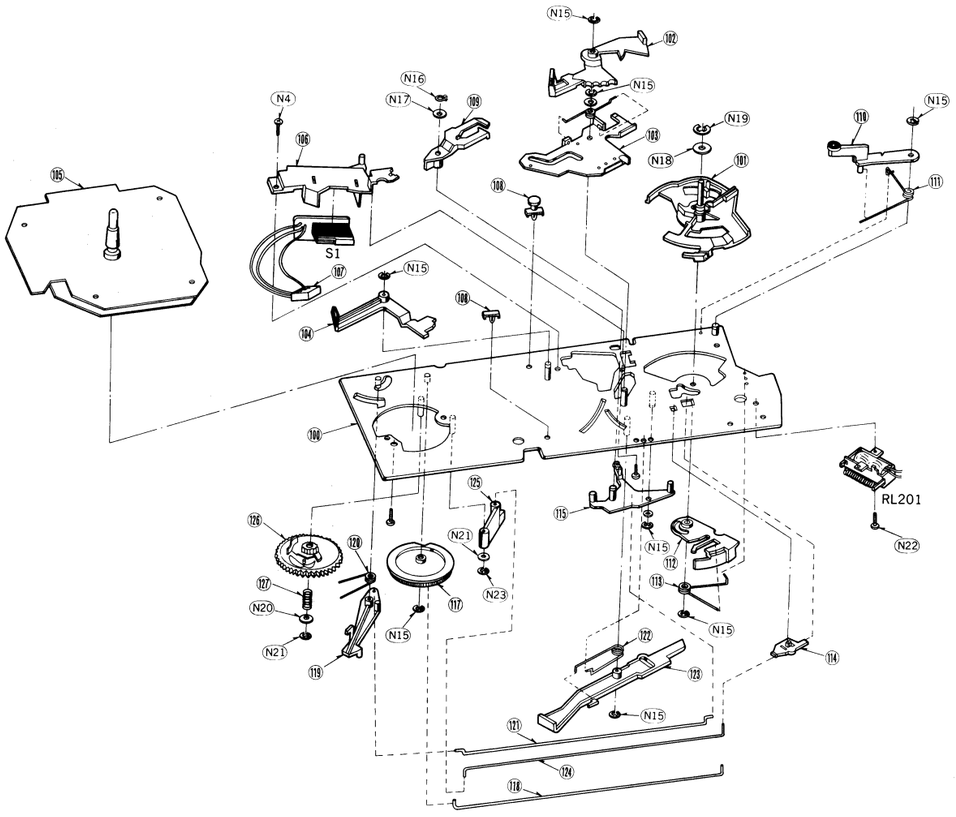
*Not available as parts, Please order to sales department.

Ref. No.		Part No.	Part Name & Description
TONE ARM PARTS			
70	O	SFPAM30301A	Tone Arm (Silver)
70	K	SFPAM30302A	Tone Arm (Black)
71		SFPWG30301A	Counterweight
72		SFPCC31002K	Head Shell
73		SFPRT30301E	Arm Rest
74		SFPRT30302E	Lift Arm
75		SFPSP30304	Spring,Lift Arm
76	O	SFGK170–01	Rubber Cap (Sliver)
76	K	SFGK171F01	Rubber Cap (Black)
77	O	SFPKD30301	Base, Tone Arm (Silver)
77	K	SFPKD30302	Base, Tone Arm (Black)
78		SFPAB30310	Sub Base, Tone Arm
79		SFPAB30305A	Plate, Lift Ass'y
80		SFPAB30301A	Plate, Tone Arm
81		SFDH212–01	Phono Cord
82		SFEL028–01E	Ground Wire
83		SFUMQ34N10	Bushing, Phono Cord
84		SFPSP30302	Spring, Anti-Skate Force Control
85		SFPJK30301	Knob, Anti-Skate Force Control
86		EPC–U25S	Cartridge, (※)
		EPS–25CS	Stylus, (※)
SCREWS, WASHERS and CIRCLIPS			
N1		XTW3+14GFZ	Screw, Tapping, ⊕ 3 x 14
N2		**XTV3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N3		**XTV3+8BFN**	Screw, Tapping, ⊕ 3 x 8
N4		XTW3+8T	Screw, Tapping, ⊕ 3 x 8
N5		XTW3+10Q	Screw, Tapping, ⊕ 3 x 10
N6		SFXGQ20–01	Screw, Tapping
N7		XTW3+10TFZ	Screw, Tapping, ⊕ 3 x 10
N8		**XTV3+10BFN**	Screw, Tapping, ⊕ 3 x 10
N9		XTW4+10QFZ	Screw, Tapping, ⊕ 4 x 10
N10		XTW4+30TFYR	Screw, Tapping, ⊕ 4 x 30
N11		**XTS3+16BFZ**	Screw, Tapping, ⊕ 3 x 16
N12		SFXGQ34N02	Screw, Tapping
N13		XYN3+C12S	Screw, Tapping, ⊕ 3 x 12
N14		XYN3+C8S	Screw, Tapping, ⊕ 3 x 8
N15		**XUC3FT**	Circlip, ϕ3
N16		**XUB4FT**	Circlip, ϕ4
N17		SFXWQ34N26	Washer
N18		SFXWQ30–11	Washer
N19		**XUC5FT**	Circlip, ϕ5
N20		**XWE4BW**	Washer, ϕ4
N21		SFXWQ34N21	Washer
N22		**XTV3+6BFN**	Screw, Tapping, ⊕ 3 x 6
N23		**XUC2FT**	Circlip, ϕ2
N24		SFPEW9601	Screw, Cartridge
N25		SFCZV8800	Washer, Cartridge
ACCESSORIES			
A1 [E]		SFNUQ34S01	Instructions Book, Printed Matter
A1 [EK]		SFNUQ34G01	Instructions Book, Printed Matter
A1 [Other Areas]		SFNUQ34X01	Instructions Book, Printed Matter
A2		SFWE212–01	Adaptor, 45r.p.m.
A3		SFCZB30505	Shell Weight
A4 [XA, XM]		SFDKI19118	2 Pin Plug
PACKING PARTS			
P1	O	SFHPQ34M01	Carton Box (Silver)
P1 [EF] only	O	SFHPQ34C01	Carton Box (Silver)
P1	K	SFHPQ34M21	Carton Box (Black)
P2		SFHHQ34N01	Pad, Front
P3		SFHHQ34N02	Pad, Rear
P4		SFHDQ34N01	Pad, Turntable
P5		SFHZ144X02	Sheet
P6		SFYH60X60	Polyethylene Bag, Unit & Dust Cover
P7		SPB1083	Polyethylene Bag, Accessories
P8		SFYH40X45	Polyethylene Bag, Turntable
P9		SFXGQ34N04	Screw, Clamp
P10		SFXW172–03	Washer, Clamp
P11 [XA, XM]		SFHDQ34X01	Front, Pad
P12 [XA, XM]		SFHDQ34X02	Rear, Pad

■ EXPLODED VIEWS.....Main Base



■ EXPLODED VIEWS.....Automatic Mechanism Plate



Ref. No.		Part No.	Part Name & Description
AUTOMATIC MECHANISM ASS'Y			
100		SFUKQ34N21E	Plate, Automatic Mechanism
101		SFUMQ34N39E	Cam, Drive
102		SFUMQ34N34E	Index Plate Ass'y
103		SFUPQ34N23E	Index Sub Plate Ass'y
104		SFUMQ34N33E	Plate, Disk Size Sensor
105		SFMZQ34N01A	Stater Frame Ass'y
106		SFUMQ34N36	Case, Switch
107		SFDJQ34N02E	Connector Ass'y 3P
108		SFEZQ34N01	Clamper
109		SFUMQ34N38	Lever, Stop
110		SFUMQ34N43	Plate, Brake
111		SFQSQ34N28	Spring, Brake
112		SFUMQ34N35	Cam, Start
113		SFQSQ34N24	Spring, Start
114		SFUMQ34N32	Support, Actuating Rod
115		SFUMQ34N37	Lever, Switch
117		SFUGQ34N22	Gear, Drive
118		SFQSQ34N22	Rod, Drive
119		SFUMQ34N31	Plate, Stop Gear
120		SFQSQ34N21	Spring, Stop Gear
121		SFQSQ34N26	Rod, Switch
122		SFQSQ34N25	Spring, Repeat Lever
123		SFUMQ34N41	Lever, Repeat
124		SFQSQ34N23	Rod, Actuating
125		SFUMQ34N42	Connector, Actuating
126		SFUGQ34N21E	Main Gear Ass'y
127		SFQAQ34N21	Spring, Main Gear

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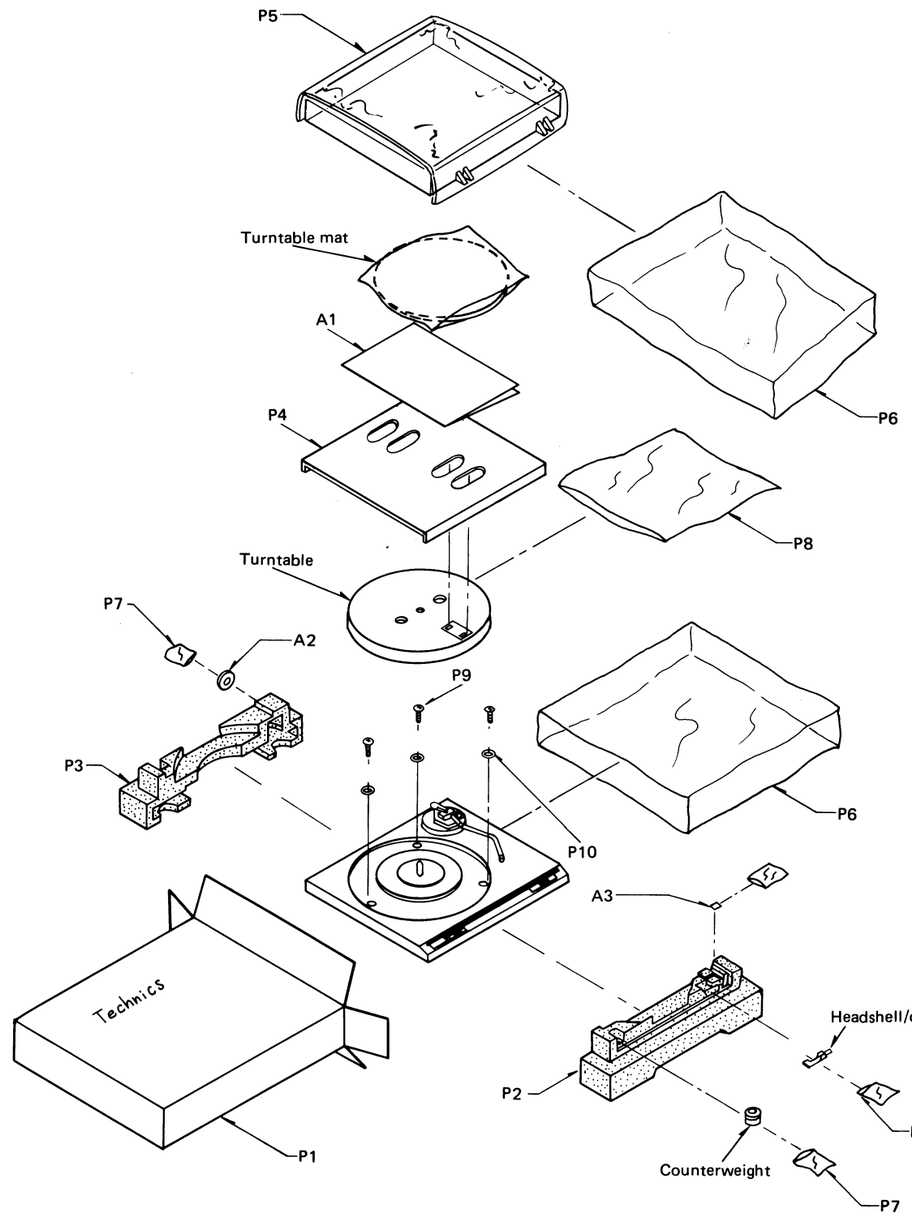
■ PACKINGS



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